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CHIEF OF NAVAL TECHNICAL TRAINING MILLINGTON TN
PROCEDURES FOR THE PLANNING, DESIGN, DEVELOPMENT, AND MANAGEMEN--ETC(U)
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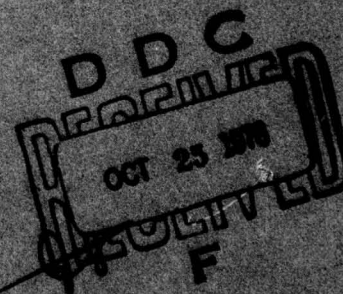
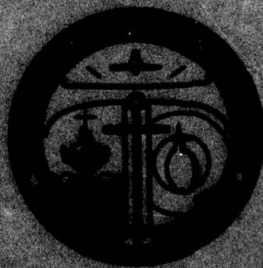
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**PROCEDURES FOR THE PLANNING,
DESIGN, DEVELOPMENT, AND MANAGEMENT
OF
NAVY TECHNICAL TRAINING COURSES**

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DEPARTMENT OF THE NAVY
CHIEF OF NAVAL TECHNICAL TRAINING
NAVAL AIR STATION MEMPHIS (75)
MILLINGTON, TENNESSEE 38054

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PROCEDURES FOR THE PLANNING,
DESIGN, DEVELOPMENT, AND MANAGEMENT
OF
NAVY TECHNICAL TRAINING COURSES.

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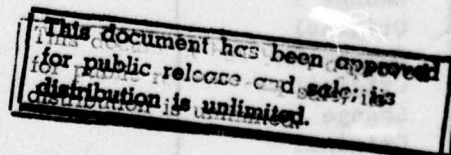
This manual contains the procedures to meet unique needs in planning, design, development, and management of Chief of Naval Technical Training Courses. Submarine training will be guided by the specifications for the development of Personnel Performance Profiles, Training Path Systems, and Curricula contained in NAVSEASYS COM (NAVORD) OD 45519.

Change 1 provides a sample format for the Job Task Inventory (JTI) and amplification to enable course developers to prepare instructional material for Computer Managed Instruction (CMI).

Subsequent to the initial publication of this manual, NAVEDTRA 106A, "Interservice Procedures for Instructional Systems Development", has been promulgated for use throughout the Naval Education and Training Command. NAVEDTRA 106A is the basic publication for ISD while this manual is designed for specific requirements of the Naval Technical Training Command. A revision of this manual is underway to incorporate the model, terminology, and other requirements of NAVEDTRA 106A.

Corrections and recommended changes are invited and should be submitted to the Chief of Naval Technical Training (Code 016). No changes to this manual are authorized until approved by the Chief of Naval Technical Training.

A. M. Sackett
A. M. SACKETT



410917 *Inc*
CHANGE 1

LIST OF EFFECTIVE PAGES

Page No.	Change in Effect	Page No.	Change in Effect
1-11	Change 1	3-81	Change 1
111-iv	Original	3-82	Original
v-vii	Change 1	3-83-3-85	Change 1
viii-Audit Trail		3-86-3-87	Original
(Overview)	Original	3-88	Change 1
1-1-1-6	Original	3-89-3-91	Original
1-7-1-12	Change 1	3-92-3-93	Change 1
1-13 (Figure 1-13 -		Audit Trail (Course	
1-80)	Change 1	Development)	Original
1-14-1-17	Change 1	4-1-4-5	Original
Audit Trail		4-6	Change 1
(Planning)	Original	4-7-4-14	Original
2-1-2-26	Original	4-15	Change 1
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Audit Trail		4-27-4-28	Change 1
(Course Design)	Original	4-29-4-32	Original
3-1-3-6	Original	4-33-4-35	Change 1
3-7-3-14	Change 1	4-36-4-43	Original
3-15	Original	Audit Trail	
3-16-3-24	Change 1	(Management)	Original
3-25-3-31	Original	Appendix A	Original
3-32-3-33	Change 1	Appendix B	Original
3-34-3-37	Original	Appendix C	Original
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REPORT USE AND EVALUATION

Feedback from activities is a vital element in improving products so that they better respond to specific needs. To assist the Chief of Naval Technical Training in future planning, it is requested that the use and evaluation form on the reverse of this page be completed and returned. The page is preaddressed and franked; fold in thirds, seal with tape, and mail.

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**PROCEDURES FOR THE PLANNING, DESIGN, DEVELOPMENT, AND
MANAGEMENT OF NAVAL TECHNICAL TRAINING COURSES**

1. Evaluation of Manual. Please check appropriate column.

FACTORS	RATING			COMMENTS
	LOW	AVE	HIGH	
Usefulness of Manual				
Timeliness				
Completeness				
Technical Accuracy				
Soundness of Approach				
Presentation and Style				
Other (specify)				

2. Use of Manual. Please fill in answers as appropriate.

a. What are your main uses for the material contained in the manual?

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NAME: _____ CODE: _____

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1.0 INTRODUCTION

An Interservice manual based on nine fundamental assumptions which relate Instructional Systems Development programs in the Armed Forces to the Systems Approach has been developed. The Interservice manual is entitled: "Interservice Procedures for Instructional Systems Development" (NAVEDTRA 106A). R

"Procedures For the Planning, Design, Development, and Management of Navy Technical Training Courses," is a manual that takes as its starting point the NAVEDTRA 106A. The purpose of this manual is to establish procedures and provide R accompanying sample formats which will be used by Naval training personnel at all levels in NTECHTRACOM down to the course level to produce technical training courses which are conducted by Chief of Naval Technical Training (CNTECHTRA) activities. It draws together into a cohesive whole, the procedures and actions which have been required by various CNTECHTRA Instructions which have addressed portions of the overall Naval Technical Training program. Continuous interface between the Fleet (the user of course graduates/products), the Fleet (administrators of technical training courses), and the course design developer is essential for the conduct of effective and efficient Naval Technical Training. This manual shall be utilized by all activities within NTECHTRACOM for the development/implementation/ evaluation/review of all Naval Technical Training courses. A

1.1 SYSTEMS APPROACH

The Systems Approach as it applies to Naval Technical Training consists of the following processes: R

1.1.1 A systematic process of gathering and analyzing data into a sequential continuum of job-performance requirements which will accomplish the mission of the Navy. These requirements should describe the full spectrum of jobs from the least skilled recruit through the most highly trained/experienced technician and manager.

1.1.2 The process of translating this job-performance data into valid job-oriented training requirements data to be analyzed and sequenced logically and consistently to provide a training pipeline.

1.1.3 The process of developing this training requirements data into learning objectives which are grouped logically and sequentially into manageable portions of the training pipeline to be designed/developed into job-relevant formal training courses, On Board Training packages (OBT), Practice Job Training programs (PJT) conducted by activities such as, or comparable to, Fleet Readiness Aviation Maintenance Programs (FRAMP's), and On-The-Job Training (OJT) in an operational billet.

1.1.4 A process to provide a system throughout the training pipeline to measure achievement of Learning Objectives by Criterion Testing.

1.1.5 A process of providing continual evaluation/review and improvement of the training pipeline based on a valid Audit Trail to provide the most efficient, cost effective, and current Naval Operating Force.

1.2 RELATING THE MANUAL TO THE SYSTEMS APPROACH PROCESS

This manual for the planner/designer/developer/manager has been developed in accordance with the Systems Approach as outlined in 1.1. Procedures with accompanying sample formats have been provided to cover all the processes as they apply to Naval Technical Training courses.

1.2.1 PLANNING

The first section of the manual pertains to the planning of Naval Technical Training from job data procurement and analysis through the production of Course Job Task Inventories and relates to the first two processes in Systems Approach.

1.2.2 DESIGN

The second section of the manual pertains to the design of Naval Technical Training courses from the Course Job Task Inventories to the production of the Course Outline and relates to the third process in Systems Approach.

1.2.3 DEVELOPMENT

The third section of the manual pertains to the development of Naval Technical Training courses from approved Course Outlines continuing through validation and relates to the third and fourth processes in Systems Approach. A

1.2.4 MANAGEMENT

The fourth section of the manual pertains to the management of Naval Technical Training courses, both from the viewpoint of CNTECHTRA and at the school/course level, and relates to the fourth and fifth processes in Systems Approach.

1.3 HOW TO USE THIS MANUAL

The primary intent of this manual is to provide personnel involved with the design and development of Navy Technical Training courses with the procedures and formats required to produce these courses. Sections on planning and management of Naval Technical Training are included to provide an overall perspective of the Naval Technical Training program.

1.3.1 PLANNERS

The first section of the manual will be of particular interest to those personnel involved in data collection and Job Task Analysis processes.

1.3.2 DESIGNERS AND DEVELOPERS

The second and third sections of the manual will be of major use to those personnel designing and developing Navy Technical Training courses.

1.3.3 MANAGERS

The fourth section of the manual is concerned primarily with the administration and management of Naval Technical Training. Those personnel designated as administrators and managers will find this section to be of particular value.

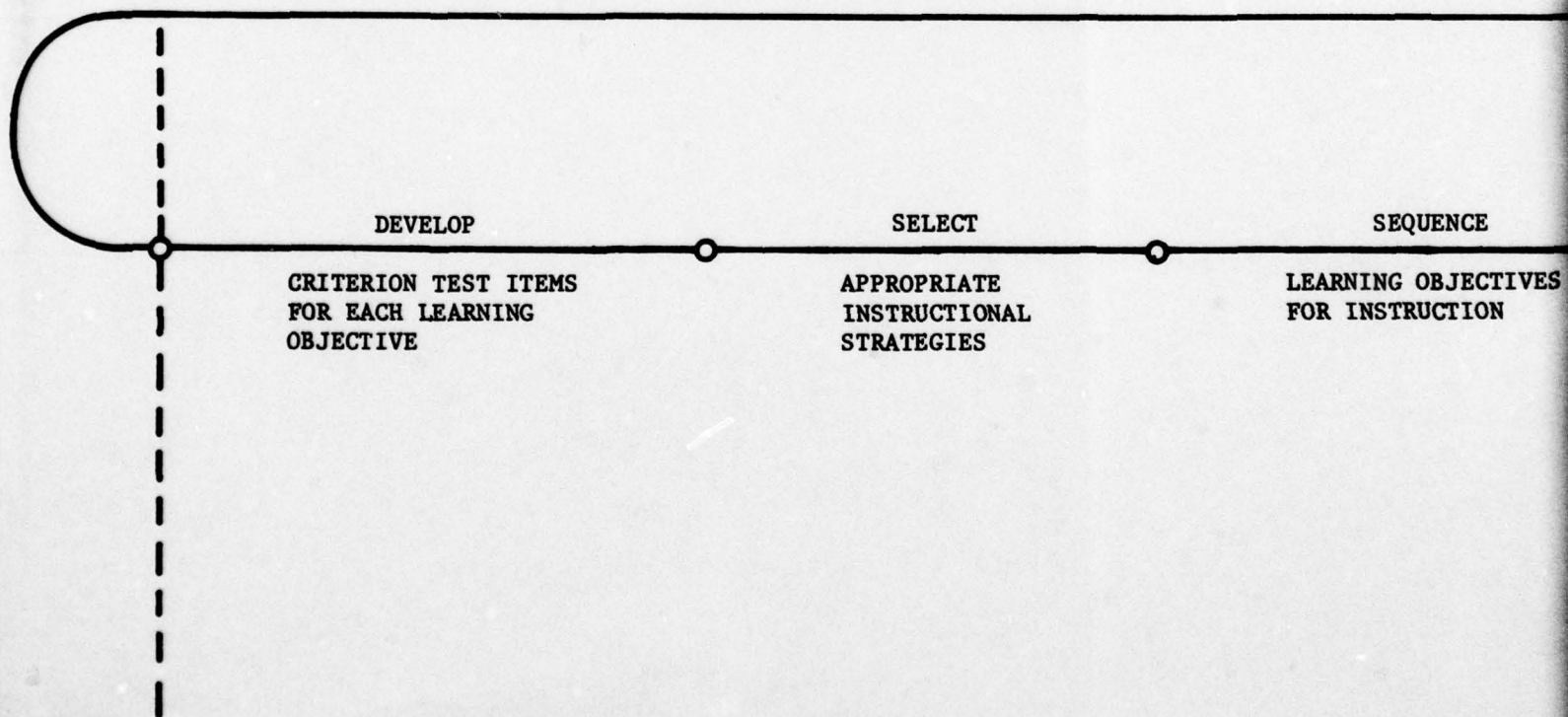
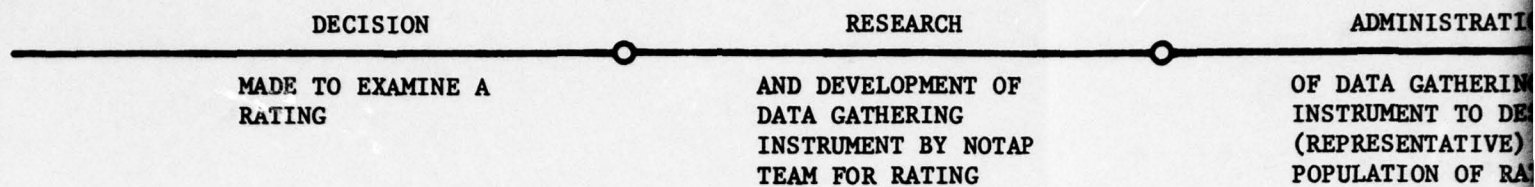
1.3.4 CROSS-UTILIZATION

It is recommended that personnel utilizing this manual first proceed to the section most closely related to the area of their concern (Design/Development, Management, or Planning) and concentrate their efforts in that particular area.

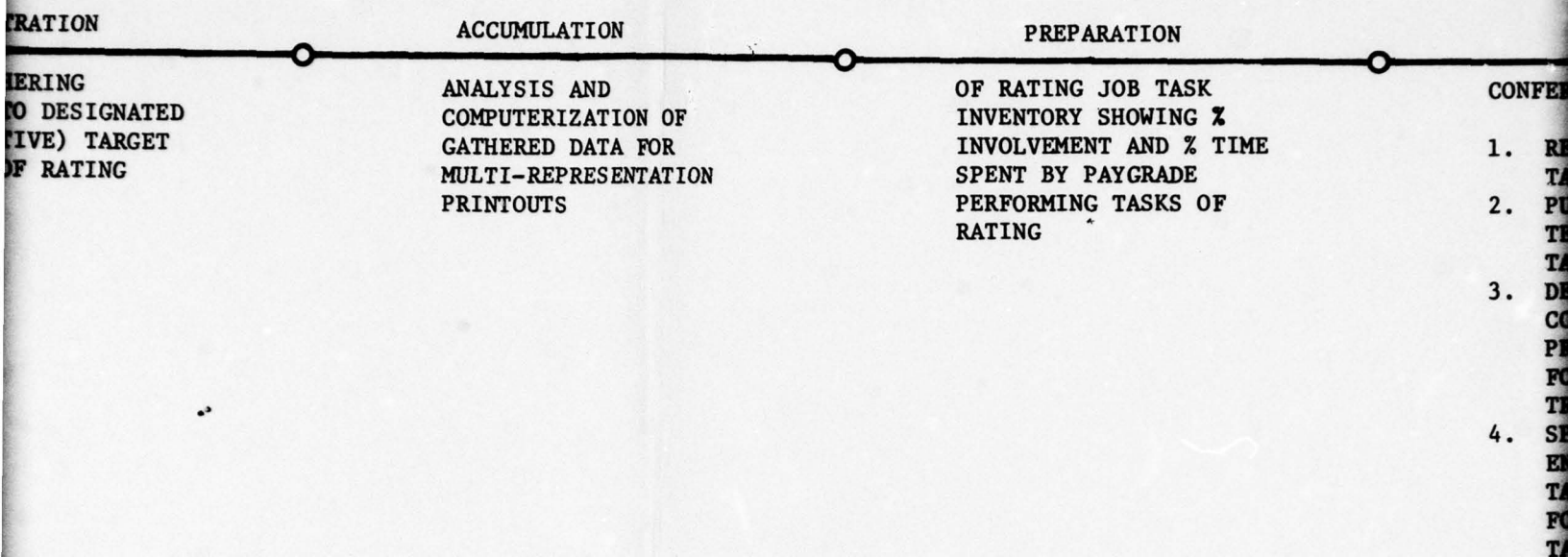
Once the area of prime concern to an individual has been assimilated other areas of the manual can be read to obtain a better overall view of Navy Technical Training.

1.3.5 OVERALL FLOW CHART

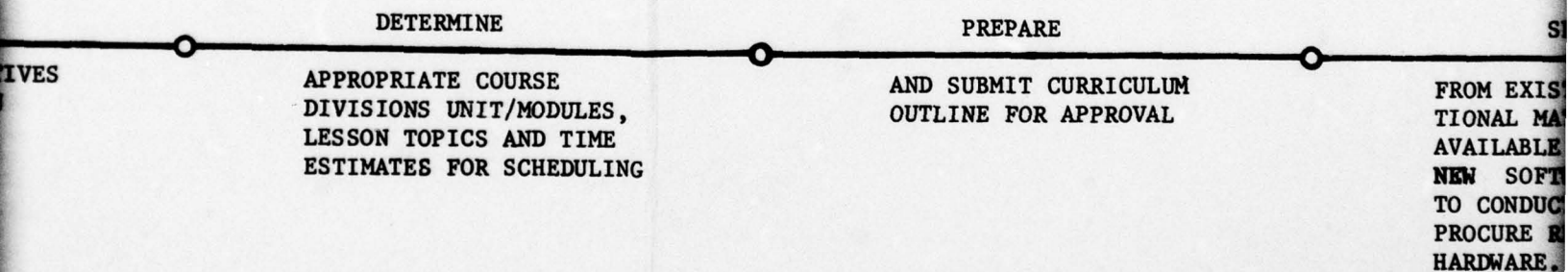
The overall flow chart, provided as Annex 1-1, gives an overview of the actions involved in all four sections of this manual --- Planning, Designing, Developing, Managing of Navy Technical Training.



PLANNING



DEVELOPMENT



CONVENE

ANALYSIS

PE

CONFERENCE TO:

1. REVIEW RATING JOB TASK INVENTORY
2. PURIFY RATING IN TERMS OF RELEVANT TASKS
3. DETERMINE JOB TASK COMBINATIONS TO PROVIDE PIPELINE FOR JOB RELEVANT TRAINING
4. SPECIFY TRAINING ENVIRONMENT JOB TASK INVENTORIES FOR RELEVANT JOB TASKS
5. DETERMINE COURSE JOB TASK INVENTORIES WHERE POSSIBLE
6. SUBMIT TO APPROPRIATE TRAINING ENVIRONMENT TASK ANALYSIS UNIT, TRAINING ENVIRONMENT JOB TASK INVENTORIES NOT RESOLVED INTO COURSE JOB TASK INVENTORIES AT CONFERENCE

BY TRAINING ENVIRONMENT TASK ANALYSIS UNIT TO DETERMINE COURSE JOB TASK INVENTORIES FOR THOSE TRAINING ENVIRONMENT JOB TASK INVENTORIES NOT PREVIOUSLY RESOLVED INTO COURSE JOB TASK INVENTORIES. ADDITIONAL NOTAP SUPPLIED DATA/PRINTOUTS MAY BE REQUESTED AND UTILIZED FOR THIS PROCESS.

TRAINING OF SELECTED TASK IN LEARNING COURSE

SELECT

CONDUCT

REVISE

EXISTING INSTRUCTIONAL MATERIALS AVAILABLE AND DEVELOP SOFTWARE AS REQUIRED TO CONDUCT COURSE. REQUIRE COURSE MATERIALS.

PILOT PROGRAM FOR VALIDATION OF COURSE

BASED ON COURSE VALIDATION IF, AND AS NECESSARY

DESIGN

PERFORM

ING TASK ANALYSIS
SELECTED COURSE JOB
INVENTORY TO DEVELOP
ING OBJECTIVES FOR
SE

DETERMINE

BASIC EQUIPMENT
REQUIREMENTS AND
INITIAL COST ESTIMATES

PREPARE

AND SUBMIT COURSE
OUTLINE FOR APPROVAL
TO DEVELOP COURSE
BASED ON LISTED
OBJECTIVES AND
EQUIPMENTS

MANAGEMENT

IMPLEMENT

AS AN OPERATIONAL
COURSE

PERFORM

CONTINUING MANAGEMENT
FUNCTIONS; ADMINISTRATION
OF COURSE CONTINUING
EVALUATION, STUDENT
PROGRESS MONITORING,
INSTRUCTIONAL STAFF
SUPPORT, ETC.

DESIGN

DETERMINE

BASIC EQUIPMENT
REQUIREMENTS AND
INITIAL COST ESTIMATES

PREPARE

AND SUBMIT COURSE
OUTLINE FOR APPROVAL
TO DEVELOP COURSE
BASED ON LISTED
OBJECTIVES AND
EQUIPMENTS

MANAGEMENT

PERFORM

CONTINUING MANAGEMENT
FUNCTIONS; ADMINISTRATION
OF COURSE CONTINUING
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PROGRESS MONITORING,
INSTRUCTIONAL STAFF
SUPPORT, ETC.

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2.0 - Task Analysis

3.0 - Data Gathering

4.0 - Job Task Analysis to Develop Job Task Inventory For a Rating

5.0 - Training Environment Task Analysis Teams

Annex 1-1 Definitions

Annex 1-2 Audit Trail - Foldout (Planning)

1.0 INTRODUCTION TO PLANNING

In the past, Navy enlisted training has been focused on the qualification of personnel for advancement in a rating structure which has been built for the purpose of providing manpower to meet the operating requirements of the fleet with the premise that advancement in rating signified corresponding advancement in qualifications for job performance.

Various methods have been used in the past by different groups within the structure of Navy training to obtain feedback from operating fleet activities concerning the effectiveness and efficiency on the job of training course graduates. Rating task surveys and graduate evaluation questionnaires have been used with some degree of effectiveness by training activities.

For a long period of time the jobs in the Navy have been grouped first into ratings and then into occupational groups of ratings having similarities either in type of work to be performed or work areas within the Navy where utilized.

Periodically, those responsible for determining the Qualifications for Advancement (rate structure within a rating) have reviewed/revised these standards which include knowledge, skill, and practical factors.

At the same time, Naval Technical Training activities have continually reviewed and revised their programs/courses to train personnel within the rating structure for job performance in operating fleet billets.

The Navy has continued at an advancing pace to become more technical and as the Navy changes so do the Navy's jobs. At the same time it has become increasingly necessary to make resources in terms of manpower and money accomplish the most with the least.

To the end of "getting the job done" in the most efficient and cost-effective way, all aspects of Navy jobs must be scrutinized, examined, and analyzed in order to design and develop the best possible system of determining what the job is and what it should be: providing job-relevant training for the job, and interfacing Naval training with Qualifications for Advancement in job groupings (ratings) and rating groupings (occupational fields) which will provide trained personnel to perform what are determined to be the Navy's job requirements.

The training required to prepare personnel to perform the jobs as they exist and/or are required in today's Navy cannot be provided solely by "rearranging" present courses. The tasks that comprise the jobs required by the Navy must be determined and training must be provided that is based on the performance of these tasks.

When the jobs as they presently exist in the Navy are known and a determination is made of what jobs are required, dramatic changes may be required in the Navy which can affect career programs, eliminate or revamp existing training programs, necessitate new training programs, and require varying degrees of modification of others.

In all respects, and in Navy training in particular, adequate planning is required to ensure currency and capability in the operating forces.

2.0 TASK ANALYSIS

The most obvious point of departure for the coordination of effort and development leading to improved efficiency and cost effectiveness in the operation of the Navy is to determine clearly what jobs are now being performed in the Navy, by whom, to what extent, how important to the Navy's mission these jobs are (criticality), what jobs are not being performed that should be, what jobs are being performed by the wrong personnel (or what personnel are performing the wrong jobs), and what jobs presently being performed should be eliminated. These determinations collectively constitute Task Analysis. Task Analysis for the Navy has been broken down into two primary processes: (1) Job Task Analysis (JTA); and (2) Training Task Analysis (TTA). It will be noted that both of these component parts of Task Analysis are processes to be carried out and that each has an output or goal to be accomplished. JTA determines what tasks must be accomplished by whom; and TTA determines how to train personnel who will accomplish these tasks.

2.1 JOB TASK ANALYSIS (JTA)

The Job Task Analysis process consists of acquiring information (data gathering) concerning what jobs are presently being performed in each Navy rating, at each rating paygrade, and presenting this information through Job Task Statements in the form of a Job Task Inventory (JTI) for a Rating. Job Task Analysis continues through a refinement process to determine a valid Job Task Inventory for a Rating and this JTI will consist of the jobs that should (and must) be performed by personnel in a rating. The Job Task Analysis process can be performed in a variety of ways as discussed in Section 2.3.

It is advisable at this point to define and show the relationship between the terms billet, job, duty, task, and task element. Figure 1-4 illustrates graphically the intended relationship.

2.1.1 Billet. A billet is the basic personnel unit of a Naval organization. It requires the fulltime services of one individual (incumbent). A billet has the following characteristics: (1) it normally utilizes related skills and knowledges; (2) it is officially established with a definite purpose and scope and exists even when vacant.

2.1.2 Job. A job consists of the performance elements that are the responsibility of the one individual assigned to a specific billet.

2.1.3 Duty. A duty is a major sub-division of a job. A duty normally exists in one functional area and is characterized as follows:

1. It is a recognized segment of a job that occupies a principal portion of a billet incumbent's work time;
2. It occurs frequently in the work cycle;
3. It involves work requiring closely related skills and knowledges.

A duty is generally performed according to a prescribed method to meet a set standard. The method and standard employed may be documented or oral, and may have been established by precedent or by higher authority.

2.1.4 Task. A task is a unit of work that forms a significant part of a duty. Tasks which constitute a duty are not necessarily homogeneous.

2.1.5 Task Element. A task element is a sub-division of a task. It is the smallest unit of work contained in the job that is considered in Job Task Analysis.

2.2 TRAINING TASK ANALYSIS (TTA)

Training Task Analysis is a process of converting the Job Task Statements from the Job Task Inventory (JTI) into Training Task Statements which will constitute a major portion of a Training Task Inventory (TTI) and serve as the basis for developing Learning Objectives to be used to design and develop training programs/courses.

2.3 VARIATIONS IN THE JOB TASK ANALYSIS PROCESS

Any method/technique for obtaining valid and reliable information concerning the nature, extent, importance, frequency, and necessity of jobs and tasks being performed in various ratings (occupational fields) and information concerning the personnel performing these jobs/tasks can provide the data for a Job Task Analysis. There are a number of such methods and techniques. For many years, Navy training activities have used rating task surveys; some schools and courses have used forms of questionnaires to obtain information concerning the capabilities of their graduates "on the job"; other training activities have developed forms of techniques and devices for task analysis to gain valuable information to be used as a basis for analysis; a Modified Task Analysis (MTA) process has been developed and used for some ratings. One of the most widely applicable methods devised for use as a basis for Job Task Analysis is the Naval Occupational Task Analysis Program (NOTAP). The NOTAP Computer data bank will eventually contain source data concerning the duties and tasks of every type of technical training. The NOTAP support activity will then be able to supply to Task Analysis personnel (wherever) data by rating and paygrade within a rating, or by occupational group if preferred, on which to base a Job Task Analysis and subsequent Training Task Analysis.

In any method selected, data gathering is the initial step in the Task Analysis process. To carry out the efforts of data gathering and all other phases of Job Task Analysis and/or Training Task Analysis, Task Analysis Teams must

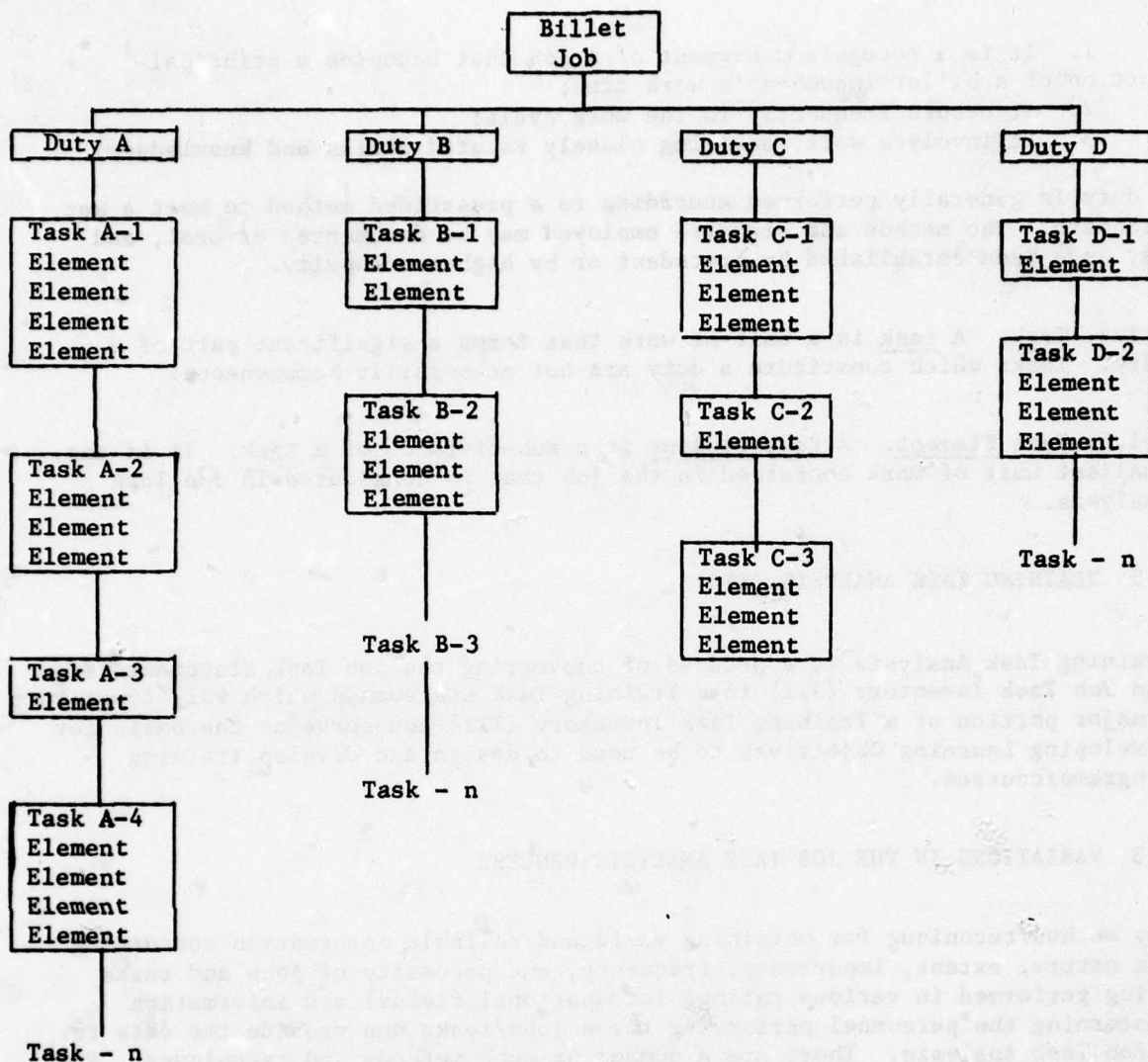


FIGURE 1-4 RELATIONSHIP OF UNITS OF WORK

be established at appropriate levels and assigned responsibilities for the initial data-gathering step and subsequent steps in the Job Task Analysis for a rating (occupational field). Task Analysis Teams shall be composed of subject-matter specialists in the rating to be analyzed, who have demonstrated their competencies in actual job performance, possess the ability to communicate clearly with others at various levels in their field, and who have demonstrated the ability to analyze, design, and develop training materials. In addition to the prerequisites listed above, members of Task Analysis Teams must possess a high degree of motivation because the Task Analysis process is a long, sometimes difficult, and sometimes tedious process. However, properly conducted, it is a process that will reap valuable benefits for the Navy.

3.0 DATA GATHERING

Before a Job Task Analysis can be performed, data must be collected concerning the job(s) (duties and tasks that constitute it) of the rating or occupational field which is to be analyzed. This data-gathering process, regardless of the method being used, should consist of the following phases and the process is conducted by a Task Analysis Team:

- Phase 1 - Research and Study
- Phase 2 - Interview and Observation
- Phase 3 - Construction of a Job Task Inventory Questionnaire
- Phase 4 - Administration of the Job Task Inventory Questionnaire
- Phase 5 - Accumulation of Responses to Job Task Inventory Questionnaire

3.1 PHASE 1 - RESEARCH AND STUDY

Prior to undertaking the analysis of a rating, the Task Analysis Team must become thoroughly familiar with all functional aspects of that rating. This shall include study of pertinent directives and instructions, manning documents, equipment listings, technical manuals, and previous studies of the rating. The team will acquire a basic knowledge of the language of the rating in order to be better able to communicate with the personnel they interview during the Interview and Observation phase. The Task Analysis Team will consult with other specialists in the rating to be analyzed and will develop a working knowledge of the skills required, tools utilized, equipment (size and complexity) involved and/or maintained, and general attributes of personnel in the given rating. These activities and the activities of Phase 2 are necessary if the Job Task Inventory Questionnaire they will develop as a data-gathering instrument is to be valid.

3.2 PHASE 2 - INTERVIEW AND OBSERVATION

In order to gather data that represents a cross-section of the rating to be analyzed, at least ten percent (or more) of the personnel in each job/duty area and in each level of the job/duty must be interviewed and observed in

their working environment. This is necessary for an overall view of the rating and will provide necessary background information on which to base the development of the Job Task Inventory Questionnaire. The Task Analysis Team must be able to communicate on the level of the worker being interviewed. They should note the "buzz" words used and obtain their definitions. Also, all common terminology for specific items or pieces of equipment used in the rating must be defined and understood by the Task Analysis Team. Both individual and group interviews will be of value, but it has been found that the data obtained is most accurate when it comes from a group made up of personnel working at the same level, performing in the same job area, and interviewed when their supervisor is not present.

3.3 PHASE 3 - CONSTRUCTION OF A JOB TASK INVENTORY QUESTIONNAIRE

When the on-site interview and observation phase has been completed, the Task Analysis Team must use the data and background information they have accumulated to construct a Job Task Inventory Questionnaire which will be their primary instrument for obtaining job/task data for the rating being analyzed. The inventory questionnaire will identify job titles, duties, tasks, equipment, tools, and "working levels" that the Task Analysis Team found to exist during Phase 2.

3.3.1 JOB TASK STATEMENT DEVELOPMENT

The Job Task Inventory Questionnaire is composed primarily of Job Task Statements describing the jobs, duties, and tasks of the rating. For each job/duty area in the rating the Task Analysis Team must list all tasks observed as they relate to a specific area. Action verbs are used in the composition of the Job Task Statements and the Team, working together, must ensure that all jobs/duties/tasks to be considered by personnel in the given rating are completely described.

3.3.2 ESSENTIAL CRITERIA FOR VALID JOB TASK STATEMENTS

To be valid, a Job Task Statement must meet three essential criteria:

1. It must be time rateable.
2. It must be mutually exclusive.
3. It must have comparable detail.

3.3.2.1 Time Rateable. To be "time rateable", a task must be performed. To "know how" to perform something is not time rateable. To "perform" something is time rateable and, therefore, is an action that can be described in a Job Task Statement.

3.3.2.2 Mutually Exclusive. Job Task Statements should be so clearly worded that they evoke a single response and do not trigger a series of responses involving related tasks. A worker, responding to Job Task Statements, must not indicate that he does not perform a given task element and then subsequently respond that he performs a task which contains the given task element.

3.3.2.3 Comparable Detail. If the job tasks are similar in level and complexity, then Job Task Statements describing them should be written to the same degree of completeness. Responses to Job Task Statements that should, and do, possess "comparable detail" or degree of completeness can be analyzed with a greater degree of validity.

3.3.3 JOB TASK STATEMENT ARRANGEMENT

When Job Task Statements for each duty/task area of each job in the rating have been written in terms of the prescribed criteria, they are arranged into some order for placement in the Job Task Inventory Questionnaire. They may be presented alphabetically as a whole list or alphabetically by duty area. The exact arrangement is not critical; however, in order to prevent demotivation on the part of the job incumbent responding to the questionnaire, the items should, if at all possible, be arranged to permit each worker to respond to at least one or more Job Task Statements in the first few pages of the questionnaire. Also, there may be some advantage to grouping by duty area so that workers not associated with a duty area could skip over these portions of the questionnaire; however, care would have to be taken so that tasks within duty areas were not overlooked if they were performed.

3.3.4 JOB-INCUMBENT RESPONSES TO JOB TASK STATEMENTS NECESSARY TO OBTAIN VALID JTI FOR RATING

Questions asked about Job Task Statements on the Job Task Inventory Questionnaire must provide the job incumbent who will complete the questionnaire with an opportunity to respond to the following minimum required information areas:

1. Paygrade (rate within rating)
2. Job/Task involvement (yes/no)
3. Job/Task involvement (Time) (Percentage which may be related to number of hrs/minutes based on 40-hour work week).
4. Job/Task involvement (Degree), assist, do, do and supervise, supervise only) R

3.3.5 BACKGROUND INFORMATION ON INCUMBENT WORKERS

The Job Task Inventory Questionnaire must include items to which a job incumbent can respond that will provide personal statistics and background information concerning the incumbent's past training and experience, length of time in the Navy, time in present job environment, etc. These items will probably be placed at the beginning of the questionnaire.

3.3.6 CODING THE JOB TASK INVENTORY QUESTIONNAIRE RESPONSE BOOKLET

If the rating being analyzed is included in a Task Analysis Program which has access to the facilities of a computer (e.g., NOTAP, etc.), it will be necessary to code the response booklet (answer sheets) used with the Job Task Inventory Questionnaire so that information received from completed response booklets can be put into the computer for manipulation and analysis. Where coding is necessary and applicable, the Task Analysis Program concerned must have the capability and responsibility for this coding process. This will involve the inclusion of computer specialists as either members of, or consultants to, the Task Analysis Team involved in the Data Gathering Process.

D

3.4 PHASE 4 - ADMINISTRATION OF THE JOB TASK INVENTORY QUESTIONNAIRE

The most accurate and usable results from the administration of the Job Task Inventory Questionnaire are obtained when the Task Analysis Team who conducted the original interview and observation phase and participated in the development of the questionnaire is utilized to administer the Job Task Inventory Questionnaire, on-site in fleet activities, to a representative sampling of job incumbents in the rating being analyzed. In those training activities where this type of questionnaire administration is not feasible, the questionnaire will be administered by that training activity's Task Analysis Team, to those personnel in the rating being analyzed as they are received by the training activity from fleet activities. (This could become a continuing process at the training activity level.)

3.5 PHASE 5 - ACCUMULATION OF RESPONSES TO JOB TASK INVENTORY QUESTIONNAIRE

The Task Analysis Team that developed the Job Task Inventory Questionnaire for a rating will collect the questionnaires and completed response booklets from a representative sampling of job incumbents in the rating being analyzed. cursory review of the completed response booklets to correct any major discrepancies that may have occurred will be sufficient until such time as a Task Analysis Team can analyze the accumulated responses and prepare a tentative Job Task Inventory for the Rating. For those activities involved in NOTAP, results of the data obtained from the NOTAP questionnaires may be requested and received by Task Analysis Team personnel in a variety of forms from the NOTAP support activity. (See Appendix A)

4.0 JOB TASK ANALYSIS TO DEVELOP JOB TASK INVENTORY FOR A RATING

After the Job Task Inventory Questionnaire has been administered to job incumbents in the rating and their responses to the questionnaire collected, a Task Analysis Team will take the data which provides specific information pertaining to job performance (duties/tasks) of the rating being analyzed and organize this information into a tentative Job Task Inventory for the Rating.

D

4.1 Information obtained from the responses to the Job Task Inventory Questionnaire will indicate for every duty/task the following:

D

1. How many (percentage) members of the rating are involved in each duty/task?
2. Who in the rating is involved in each duty/task: (What rate/paygrade)?
3. How much time involvement (percentage which may be related to number of hours/minutes based on 40-hour week) is spent on the duty/task?
4. What degree of member involvement in each duty/task by indicating whether they are:
 - a. Assisting
 - b. Doing
 - c. Doing and Supervising
 - d. Supervising Only

4.2 NOTAP or other computer-based systems will be able to provide printouts of this information in a variety of formats. The information becomes the tentative Job Task Inventory for the Rating when organized into the prescribed format, Figure 1-13A (Enclosure (1), (2), (3), (4), and (5)). A decision-making conference must be convened and attended by management representatives of NTECHTRACOM and other training pipeline activities, subject-matter specialists in the rating who collectively are cognizant of what makes up the total training pipeline, specialists in course design/development, and members of the Task Analysis Team which developed the tentative JTI for the rating to review and analyze the tentative Rating JTI.

R

A

4.2.1 This review/analysis will consider the following questions and the conferees will arrive at acceptable answers/decisions:

1. Does a duty/task belong in the rating at all? If not, then where?
2. Are there duties/tasks required in the rating that have been omitted? If so, what?
3. Are the duties/tasks valid for the rating but being performed at the wrong level (rate/paygrade)? If so, where should they be?
4. Are the NEC's valid? If not, how should they be designated?

A

4.2.2 As its first objective, the conference will produce a refined and purified Job Task Inventory (JTI) for the Rating.

4.2.3 Participants in a final JTI conference will review and make decisions for respective Training Environments responsible for the overall training pipeline. Training Environments that constitute the total training pipeline and shall be represented at the conference are:

R

1. CLASS R - Training upon initial enlistment or induction which provides for general indoctrination and prepares the recruit for early

adjustment to military life by providing skill and knowledge in basic military subjects. TPC's for Class R training will designate the training activity responsible for receiving a JTI for that Training Environment.

2. CLASS A - Provide the basic technical knowledge and skills required to prepare for job entry level performance and further specialized training. Includes apprenticeship training. An NEC may be awarded to identify the skill achieved. Also includes some officer courses such as Communications Officer, ASW Officer, etc. TPC's for Class A training in all ratings under their cognizance will designate the training activity responsible for receiving a JTI for that Training Environment.

3. CLASS C - Provide the advanced knowledge, skills, and techniques to perform a particular job in the billet. An NEC or NOBC may be awarded to identify the skill achieved. Includes schools/courses previously identified as Class B. TPC's for Class C training in all ratings under their cognizance will designate the training activity responsible for receiving a JTI for that Training Environment.

4. CLASS F - Provide team training to fleet personnel, officers and enlisted, who normally are, or are enroute to duty as, members of ships' companies, and refresher training, including operators and technical courses of short duration to meet the needs of a fleet or type commander. The type commander shall designate appropriate activities to be responsible for receiving JTI's for this Training Environment.

4.2.4 The Training Environment Job Task Inventories determined by the conference will be forwarded to appropriate "A", "C", and "F" activities as discussed in Section 4-2-3, page 1-9 for completion of the JTA. These activities will also conduct a TTA to design/develop job-relevant training in whatever form is required (e.g. formal training courses, OBT packages, programs of training to be conducted by organizations such as or comparable to FRAMP's, training to be conducted on the job, OJT, etc.).

4.3 Training Environment JTI's will be used by the assigned training activity as a working base for its Task Analysis Team. The Training Environment Task Analysis Team must reduce the JTI for its Training Environment to specific Course JTI's in order to proceed with the next step in the Task Analysis process which is Training Task Analysis (TTA).

4.4 In all cases where NOTAP has analyzed a rating, the procedures of developing, preparing, and administering the Job Task Inventory Questionnaire and accumulating data will have been accomplished by the NOTAP support activity and this activity will supply the tentative Job Task Inventory for the Rating (in the format discussed above) to be reviewed/analyzed by members of the conference discussed in section 4.2. The NOTAP support activity will supply, upon request, additional computer printouts of data that can be used by the Training Environment Task Analysis Team as required in completing the Job Task Analysis process. A variety of NOTAP computer printouts are available for use in the Training Task Analysis process as required. Additional information and guidance in the application of NOTAP data is provided in Appendix A.

5.0 TRAINING ENVIRONMENT TASK ANALYSIS TEAMS

The conference discussed in Chapter 4 resulted in the assignment of a Job Task Inventory for a Training Environment to the appropriate training activity. This JTI contains a portion of the duties/tasks that are performed by job incumbents in a particular rating. The training activity to which this Job Task Inventory is assigned is responsible for completing the Job Task Analysis to determine Course Job Task Inventories, or their equivalents, for smaller training portions of the training pipeline; and conducting Training Task Analysis to develop course (or training packages) Learning Objectives and a Course Outline. If there are Job Tasks Statements from the refined JTI for a rating that are determined by the conference to be common to more than one Training Environment, the particular training activity assigned responsibility for these common Job Task Statements will be instructed to work in liaison with the training activities that are cognizant over the other Training Environments involved.

5.1 A Training Activity that has been designated to analyze a Training Environment Job Task Inventory and reduce it to Course Job Task Inventories, or equivalents, must have a Task Analysis Team. This Task Analysis Team will probably be a part of a Training Analysis Unit if the training activity already has such a unit. Training Activities designated to complete Job Task Analysis processes and conduct Training Task Analyses which do not presently have Task Analysis Team capabilities must select and arrange for the training of personnel to perform these duties. The Training Environment Task Analysis Team will be composed of personnel who have demonstrated capabilities in the areas of Task Analysis procedures, course design and development procedures, programmed instruction writing procedures, and subject-matter specialty peculiar to the rating being analyzed and the training environment involved.

5.2 The Training Environment Task Analysis Team will use the data accumulated from responses to the Job Task Inventory Questionnaires and arranged in various combinations to determine how to break down the Job Task Inventories for Training Environments into smaller units of specific Course Job Task Inventories. This data may be provided by computer printouts. Appendix A, Naval Occupational Task Analysis Program (NOTAP), provides additional guidance on methods and techniques and computerized data to be used at this stage of the analysis for those ratings analyzed by NOTAP. In general, the methods and techniques used by the Task Analysis Team will depend on the Training Environment and rating involved. Job Task Inventories for some Ratings and some Training Environments, such as formal technical training, may be clear-cut and selections of duties and tasks for grouping into Course Job Task Inventories may be apparent and can be accomplished without difficulty. This is because the duties and tasks will be so related that they can be placed into a logical order or arrangement. Information concerning degree of job-incumbent involvement in these duties and tasks provided by Job Task Analysis data will permit assessment of depth (extent) of training that will be required in these areas.

5.3 In Training Environments that involve operational or specialized courses, the Task Analysis Team may desire/require more additional data concerning the nature of the personnel and their involvement in duties and tasks of the rating that have been assigned to their training environment before they can

produce clear and valid Course Job Task Inventories. If this is true, the Task Analysis Team can obtain additional data and combinations of data from the agency or activity that conducted the data gathering, accumulation, sorting and grouping stages of the Task Analysis process.

5.4 The data necessary to produce a tentative Job Task Inventory for a Rating can be obtained from NOTAP supported by other sources (e.g., PQS, Technical Manuals, PMS, etc.), but these must be documented in such a manner that they can be audited. The tentative Job Task Inventory for the Rating will be submitted to CNTECHTRA for review and approval. Upon the receipt of the tentative JTI, CNTECHTRA will convene a conference with the participation of appropriate training commanders to develop a refined JTI. Based on knowledge of the nature of the overall training pipeline, Job Task Inventories for Training Environments can be further shredded out by members of this conference. When the refined JTI is completed, CNET, Systems Commanders, and Warfare Sponsors will be invited to participate in a final JTI review and a Course Development Manager will be designated utilizing Task Analysis Teams trained to work in their particular Training Environment areas can reduce Job Task Inventories for Training Environments to Job Task Inventories for Courses (or their equivalents). JTI for all ratings/courses will be submitted to CNTECHTRA for approval. These may be submitted in separate or combined documents. The following items will be included in the submission of the tentative JTI Rating Package: (Sample items, Figure 1-13)

1. Letter of Promulgation
2. Job Area Diagram (Encl (1) for ADJ, Encl (2) for ADR)
3. Recommended Training Environment for AD Tasks Performed (Enclosure (3))
4. Degree of Task Involvement Summary by Skill Levels (Enclosure (4) for ADJ, Enclosure (5) for ADR)
5. Diagram of Training Modules for AD Rating (Enclosure (6))
6. Proposed Course Job Task Inventory (Enclosure (7) for the ADJ (A1) Course, Enclosure (8) for ADR (A1) Module(s), Enclosure (9) for BASHEL (A1) Module(s)).

Additional items (Sample items, Figure 1-13, Enclosures (6), (7), (8), and (9)) may be included in the tentative JTI based on time constraints and other factors of the rating involved. Liaison is directed between designated training activities whose assigned JTI's for Training Environments contain common Job Task Statements.

5.5 At this point, the Job Task Analysis is complete and training responsibility for every valid duty and task in a rating has been determined. Therefore, no holes have been left in the training pipeline. It is now necessary to assign each training responsibility (Course JTI or equivalent) to the appropriate Task Analysis Team who will work closely with additional subject-matter specialists (from the area that will develop and conduct the course) to accomplish the Training Task Analysis process which will result in the development of Learning Objectives for the course. The Job Task Statements (for duties and tasks) of the Job Task Inventories must be converted to Training Task Statements which will form a major part of the Training Task Inventory (Course, Training Environment, or Rating). These Training Task Statements become the behavior elements of Learning Objectives. The Training Task Analysis will continue until all Learning Objectives are completed (to contain behavior, conditions and standards).

Naval Air Technical Training Center
Naval Air Station Memphis
Millington, Tennessee 38054

Code 701

S A M P L E

From: Commanding Officer
To: Chief of Naval Technical Training (Code 424)
Subj: Recommended course job task inventories for Aviation Machinist's Mate (AD) rating based on job task analysis; request for approval of
Ref: (a) CNO ltr ser 59/653 of 17 Jan 1974
(b) CNTT A-10
(c) CNTECHTRA ltr Code 423 of 31 Jul 1973
Encl: (1) ADJ Job Area Diagram
(2) ADR Job Area Diagram
(3) Recommended Training Environment for AD Tasks Performed
(4) ADJ Service Rating Degree of Task Involvement Summary by Skill Levels
(5) ADR Service Rating Degree of Task Involvement Summary by Skill Levels
(6) Diagram of Training Modules for AD Rating
(7) Proposed Course Job Task Inventory for the ADJ (A1) Course
(8) Proposed Course Job Task Inventory for ADR (A1) Module(s)
(9) Proposed Course Job Task Inventory for BASHEL (A1) Module(s)

1. Background

a. References (a), (b), and (c) promulgated policies applicable to developing and revising valid training programs based on Job Task Analysis. In accordance with references (a), (b), and (c), a Job Task Analysis of the enlisted personnel in the Aviation Machinist's Mate (AD) rating was performed.

b. The Manual of Qualifications for Advancement, NAVPERS 18068C, currently indicates two service ratings: ADJ (Jet Engine Mechanic) and ADR (Reciprocating Engine Mechanic). The individual service ratings exist

FIGURE 1-13

Letter of Promulgation

CHANGE 1

1-13

1

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at pay grades E-2 thru E-7 and compress at general rates ADCS and AFCM at pay grades E-8 and E-9.

c. Occupational information collected, by NOTAP, from all segments of the AD community was analyzed at this Command. The data collected and analyzed reflects what work is actually being performed in the Fleet by personnel in the rating.

2. Approach

a. For the purpose of analysis, the ADJ and ADR jobs were grouped together (clustered), within each service rating, on the basis of time similarity. This was accomplished, by NOTAP, utilizing computer programs using task performance data provided by individual billet incumbents.

b. The criteria utilized to determine the validity of each task is that the task should be performed by 15-20 percent or more of the personnel in a job (grouped stage). Review of the statistical data revealed that a number of significant tasks fall in the 15 and above percent range of personnel performing in the rating. The cut off of 15 percent provided a greater number of tasks which were more representative of the skills required in the rating. This statistical training analysis approach has provided a more objective method of identifying job areas and extracting the course job task inventories.

c. The training recommendations produced have been reviewed by subject matter experts for possible training conflicts, special training requirements, etc.. Additionally, those tasks falling below the 15 percent cut-off have been reviewed for the purpose of identifying those tasks indicating low numbers of personnel involvement, but require necessary skill capability which should be included in the training pipeline for the rating.

3. Findings

a. The overall findings revealed that the AD rating is currently structured so that no extreme problem areas exist that would impede mission accomplishment. With the implementation of the recommendations as outlined, the AD rating will be more effectively organized and structured.

b. Analysis of the NOTAP data for the two service ratings revealed that each is structured into several major job areas. Enclosures (1) and (2) are diagrams of major work areas, within each service rating,

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with the percent of involvement and average percent time spent, by each group, within each duty. Included is the percent of personnel by skill levels: Apprentice (E-2 thru E-4), Journeymen (E-5 and E-6), and Supervisors and Managers (E-7 and E-8).

c. Of particular interest is the various skill level involvement within each job area. For example, of the apprentices working in the power plant maintenance job area within each service rating, it was found that 97 percent had at least one year in their respective activities. Whereas the apprentices working as plane captains and/or flight line maintenance, within each service rating, had, predominately, less than one year in their respective activities.

d. With few exceptions, apprentices and journeymen generally perform the same types of duty/tasks. Amounts of time performing the duty or task does, however, vary between the skill levels. For example, apprentices supervise other apprentices but spend far less time in supervising duties and tasks than the journeymen. Considerable overlap exists in duty task performance by the various pay grades.

e. Analysis indicated time spent in each duty area by personnel in both AD service ratings is nearly equal. Major changes in the amount of time spent in various duty areas were normally a function of change in pay grade rather than service ratings. The analysis revealed that the following duties were performed equally by both service rating personnel.

- (1) F Fundamental Aviation Maintenance
- (2) G Aviation Line Maintenance
- (3) J General Power Plant Maintenance

f. Four specialization maintenance duties represent the only differences.

- (1) K Jet Engine Maintenance
- (2) L Reciprocating Engine Maintenance
- (3) N Propeller Maintenance
- (4) P General Helicopter Maintenance

The latter two duties are performed by both service ratings in varying degrees. Jet engine maintenance tasks are performed primarily by ADJ's, and reciprocating engine maintenance tasks are performed almost exclusively by ADR's. It should be noted, however, that these identifiable

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areas of specialization represent only a small percent of total work time. For example, task performance, by the ADR's, in reciprocating engine maintenance (duty L) revealed that the average percent of time spent by all cases in the survey was only 6.6 percent. This was an average of 2 1/2 hours of a 40 hour work week.

g. Enclosures (3) thru (9) are the results of analysis of the NOTAP Aviation Machinist's Mate survey. Enclosure (3) is a listing of all AD duty tasks with a recommended training environment. Enclosures (4) and (5) are in support of the recommendations cited in enclosure (3). They are a listing of all AD duty tasks showing the percentage of members performing, and the average percent of time spent by all members within skill levels. Enclosure (6) is a diagram of the recommended modules of training which this Command feels is a logical and valid basis for the restructure of the AD training. Enclosures (7), (8), and (9) are the proposed course job task inventories for the ADJ (A1) Course, ADR (A1) Course, and the AD BASHEL (A1) Course.

h. The proposed NEOCS occupational standards, for the subject service ratings, were reviewed. All NEOCS task statements were found to be in accordance with the NOTAP tasks, with the exception of standard topic "Environmental Pollution Control." The six task statements listed were inserted in the ADJ (A1) Course Job Task Inventory (enclosure (7)).

4. Recommendations

a. Recent action taken by the AD Rating Review Board disestablished the AD service ratings (ADJ and ADR) but maintained the rating of AD. Based on this action, and on the results of the analysis of the NOTAP (AD) survey, enclosures (3) thru (9), the following recommendations are submitted:

(1) Revise the ADJ (A1) Course to establish an AD (A1) Course that would provide common core training for all AD initial entry personnel.

(2) Provide modules of selected training in reciprocating engine maintenance for designated students.

(3) Provide modules of selected training in helicopter maintenance for designated students.

5. It is requested that enclosures (6) thru (9) be approved as the basis for establishment of an AD (A1) Course with selected modules cited in 4a(2) and 4a(3).

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Subj: Recommended course job task inventories for Aviation Machinist's Mate (AD) rating based on job task analysis; request for approval of

**Copy to:
CNTECHTRA (4)
NAMTRAGRU**

FIGURE 1-13

5

Letter of Promulgation

CHANGE 1

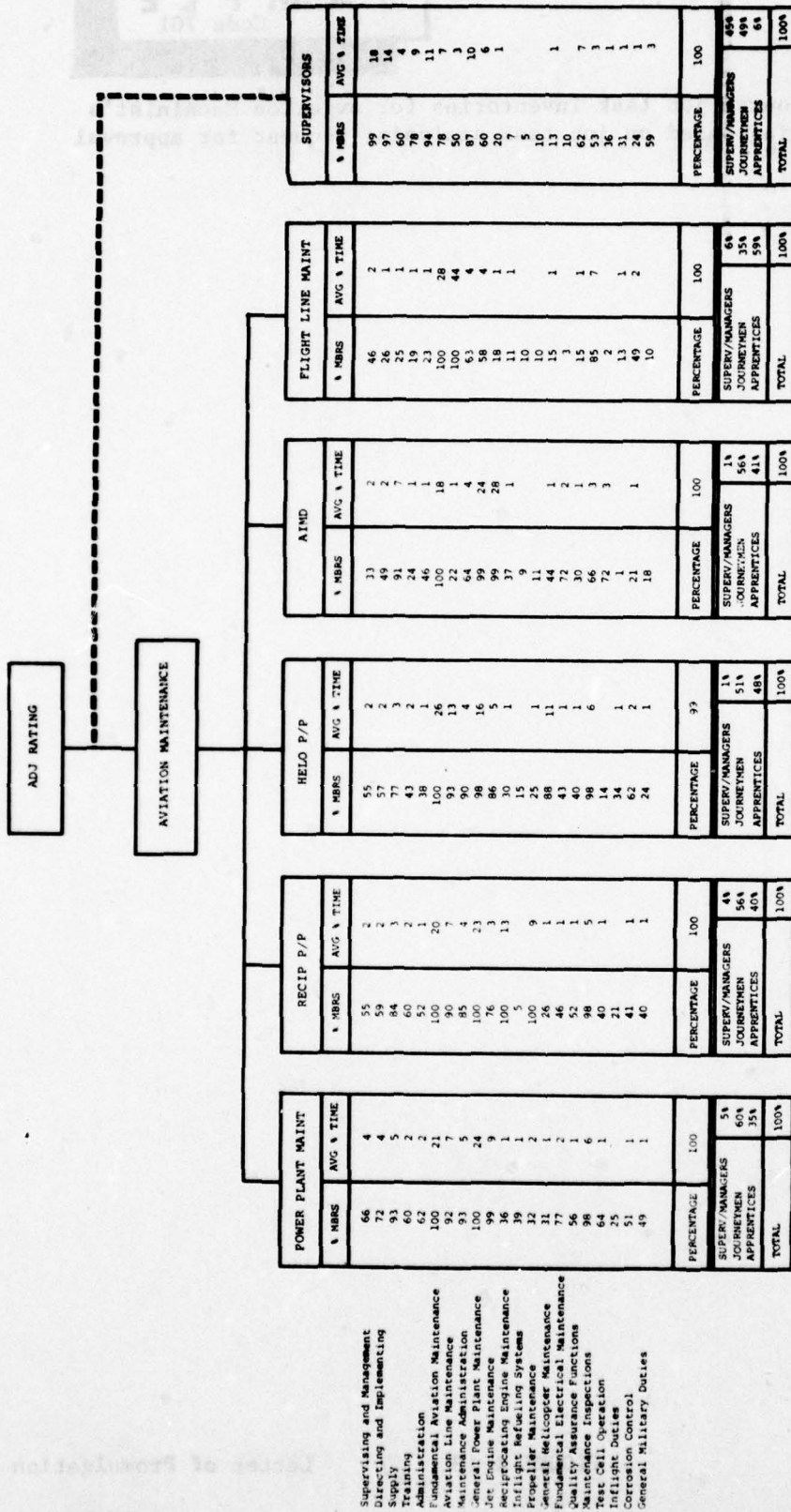


FIGURE 1-13A 6 Enclosure (1) to Letter of Promulgation CHANGE 1



FIGURE 1-13B Enclosure (2) to Letter of Promulgation CHANGE 1

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADB Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
A	SUPERVISING AND MANAGEMENT												
A 1	Assign aircraft to flight schedules					X							X

[illegible][illegible]

FIGURE 1-13C	Enclosure (3) to Letter of Promulgation	CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Performance Training Environment for Aviation Maintenance Entry (J) and (MILCIP.)													
Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment					ADR Training Environment						
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
B	DIRECTING AND IMPLEMENTING												
B 1	Make work assignments					X							X

(MAP's, SAF's, TDC's)													
B 2	Prepare civilian performance evaluations					X						X	
B 3	Prepare enlisted performance evaluations					X						X	
B 4	Prepare/wade the watch, quarter, and station bill					X						X	
B 5	Recommend approval/disapproval of special request chits					X						X	
B 6	Schedule events, including, QA audits, FOD walkdown, etc.)					X						X	
B 7	Prepare summary request for list/damaged material					X						X	
B 8	Recommend personnel for advancement in rate					X						X	
B 9	Recommend personnel for duty programs (Sailor of the Month, NMEP, ADCOF, etc.)					X						X	
B 10	Inspect maintenance space/assigned areas for safety discrepancies					X						X	
B 11	Recommend personnel for collection duty/quality assurance inspector					X						X	
B 12	Provide technical assistance to other work centers					X						X	
B 13	Sign off personnel qualifications (PQS)					X						X	

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CRANCE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
C	SUPPLY												
C 1	Order publications		X		X		X		X		X		X

C	Issue equipment (parts, tools, GSE) on subcustody	*DNA											
C 6	Pack, turn in equipment for repair or inspection (bottles, carts, chutes, GSE, etc.)	*DNA											
C 7	Pack-up/alter supplies (equipment, parts, etc.)	*DNA											
C 8	Stow arms, supplies and equipment	*DNA											
C 9	Package selected equipment for shipment/storage	*DNA											
C 10	Issue surplus equipment	*DNA											
C 11	Order parts/supplies		X						X				
C 12	Inventory engine		X		X				X				
C 13	Inventory engine accessories		X		X				X				
C 14	Place identifying marks on tools (nails, etc., tape, etc.)												X

*DNA applies to other ratings, NABF functions or unjustifiable percentages throughout this report.

Recommended Training Environment for Tasks Performed by Aviation Mechanic's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
D	TRAINING												
D 1	Prepare training lectures				X						X		X

D 2	Administer examinations/tests				X						X		X
D 6	Maintain training records				X						X		X
D 7	Prepare examinations/tests				X						X		X
D 8	Write lesson guide				X						X		X
D 9	Construct training aid				X						X		X

FIGURE 1-13C

Enclosure 3, to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
E	ADMINISTRATION												
E 1	Investigate accidents/incidents (non-aviation)					X						X	

E	Outline peer work to work centers					X							X
E 5	File messages, reports, and records				X	X					X		X
E 6	Make arrangements for social functions (parties, luncheon, etc.)						X						X
E 7	Prepare training manual			X		X							X
E 8	Update the record book						X						X
E 9	Update publication of the functions			X		X						X	
E 10	Maintain status board			X		X						X	
E 11	Change staff combined			X		X						X	
E 12	Cut stencils												
E 13	Construct status board												
E 14	Conduct investigations of disciplinary cases											X	
E 15	Review (chop) outgoing correspondence/messages						X					X	

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADI Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
P	FUNDAMENTAL AVIATION MAINTENANCE												
P 1	Safety wire aircraft component (rotor assemblies)	X						X	X				

P 2	Inspect/replace equipment/parts												
P 3	Inspect/replace low point drains												
P 4	Inspect/replace safety equipment for proper operation (separators, fire extinguishers, filters, etc., etc.)												
P 5	Remove/replace fuel lines, gaskets, hoses, etc.												
P 6	Remove/replace fuel filter bulbs/knobs												
P 7	Attach/replace aircraft components												
P 8	Attach/replace aircraft protective covers												
P 9	Fuel/defuel aircraft												
P 10	Take fuel samples												
P 11	Take oil samples												
P 12	Take hydraulic fluid samples												
P 13													
P 14													

P 15	Wash/clean aircraft												
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FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	P	MAB	OST	AP	A	C	P	MAS	OST
G	AVIATION LINE MAINTENANCE												
G 1	Dip-check fuel tanks				X							X	

G 2	Check battery jars												
G 3	Perform daily/pre-operational check on ground support equipment (yellow gear)												
G 4	Inspect aircraft towing standard aircraft												
G 5	Install engine aircraft downlocks, jury rigging, safety harness, rounding wires												
G 6	Check aircraft/pull hook												
G 7	Hide aircraft												
G 8	Push aircraft												
G 9	Tow aircraft												
G 10	Act as safety observer during aircraft movement (walk with)												
G 11	Install drag chutes in aircraft												
G 12													
G 13													

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty Task Identifier	Duty and Task Titles	ADJ Training Environment							ADM Training Environment						
		AP	A	C	P	MAS	OST	AP	A	C	P	MAS	OST	AP	OST
1	MAINTENANCE ADMINISTRATION														
1	Fill out support action forms (SAP's)	X	X								X			X	

2	Make entries in aircraft/engine log book														
3	Prepare public works work request														
4	Prepare aircraft passenger/cargo manifests														
5	Fill out maintenance accounting (MEA) cards														
6	Fill out maintenance work requests														
7	Maintain knowledge of logs														
8	Prepare technical reports (ME, A/C incident, etc.)														
9	Fill out aircraft status data (FSD) cards														
10	Update visual information display system (VIDS board)														
11	Fill out maintenance action forms (MAF's)														
12	Fill out technical preventive maintenance forms (TDC's)														
13	Fill out configuration control forms (CCF)														
14															
15															

FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanic's Mate (J) and (Recip.)

Duty Task Identifier	Duty and Task Titles	ADJ Training Environment					ADR Training Environment						
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
J	GENERAL POWER PLANT MAINTENANCE												
J 1	Remove/replace flexible shafts		X						X			X	

J 2	Remove/replace throttle quadrants		X						X				X
J 3	Rebuild engine mounts												
J 4	Rebuild engine mounts												
J 5	Rebuild engine mounts												
J 6	Rebuild engine mounts												
J 7	Remove/replace injectors in fuel cells												
J 8	Service compression drive (CSD)		X										
J 9	Remove/replace carburetors												
J 10	Can/weld engine		X						X				X
J 11	Clean and flush fuel lines (carburetors, fuel, etc.)		X						X				X
J 12	Weld-arc (gas shield) weld metals												
J 13	Acetylene weld metals												
J 14	Electric ARC weld metals												

J 15	Remove/replace injectors (engines, drive shafts, etc.)		X										
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FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADU Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
K	JET ENGINE MAINTENANCE												
K 1	Rebuild engine mounted gear boxes												

*DMA

K 4	Remove/replace afterburner spray bar												
K 5	Remove/replace afterburner flaps/rollers/seals												
K 6	Remove/replace afterburner flame holder												
K 7	Adjust afterburner nozzle opening (sizing)												
K 8	Adjust afterburner flame												
K 9	"Tune" liquid jet engine												
K 10	Big nozzle (jet control valve) to nozzle opening												
K 11	Remove/replace timing bearing												
K 12	Remove/replace combustion chamber (burner cans)												
K 13	Check combustion chamber burner spray pattern												
K 14	Service auxiliary power unit												
K 15	Remove/replace fuel pump and filter blocks												

K 16	Remove/replace compressor rotor blades/segments												
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FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
L	RECIPROCATING ENGINE MAINTENANCE												
L 1	Remove/replace engine cooling baffles							X			X		

L 2	Remove/replace magnetos							X			X		
L 6	Remove/replace spark plugs							X			X		
L 7	Remove/replace reciprocating engine cylinders							X			X		
L 8	Remove/replace distributors							X			X		
L 9	Perform compression check							X			X		
L 10	Repack pushrod bearings							X			X		
L 11	Adjust carburetors							X			X		
L 12	Time reciprocating							X			X		
L 13	Rebuild distributor by replacing component parts							X			X		

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADM Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
M	INFLIGHT REFUELING SYSTEMS												
M 1	Remove/replace hydraulic motors				X								

M 2	Remove/replace gunnrotine assembly (IFR)				X								
M 3	Rebuild gunnrotine assembly (IFR)				X								
M 4	Remove/replace hose reel assembly (IFR)				X								
M 5	Rebuild/drague assembly				X								
M 6	Remove/replace fuel hose				X								
M 7	Remove/replace storage assembly				X								
M 8	Adjust hose reel (IFR)				X								
M 9													
M 10													

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment					ADR Training Environment						
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
N	PROPELLER MAINTENANCE												
N 1	Rebuild propeller governors										X		
N 2	Remove/replace spin block assembly												
N 3	Remove/replace propeller dome (spinner)				X			X					
N 4	Remove/replace blade limit switches												
N 5	Remove/replace propeller blades				X								
N 6	Remove/replace propeller valve housing				X								
N 7	Align propeller blade				X								
N 8	Perform "in" test on propeller blades												
N 9	Balance propellers												
N 10	Remove/replace propeller de-icing boots												
N 11	Remove/replace propeller governor				X			X					
N 12	Adjust propeller governor				X			X					
N 13	Remove/replace propeller assembly				X			X					
N 14	Finish/degas propeller dome assembly												
N 15													
N 16													

FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADM Training Environment					
		AP	A	C	P	MAS	OBT	AP	A	C	P	MAS	OBT
P 1	GENERAL HELICOPTER MAINTENANCE												
P 1	Fold helicopter blades				X								

P 1	Remove/replace tail rotor assembly				X								
P 2	Remove/replace helicopter transmissions				X								
P 6	Remove/replace right angle drive (power turbine)				X								
P 7	Remove/replace tip rotor transmissions				X								
P 8	Remove/replace main train gear boxes (tail, rotor drive, etc.)				X								
P 9	Remove/replace rotor hubs				X								
P 10	Remove/replace helicopter drive shaft sections				X								
P 11	Remove/replace tail rotor				X								
P 12	Remove/replace wash lances				X								
P 13	Remove/replace helicopter rotor blades				X								
P 14	Track rotor blades				X								
P 15	Replace water-tight seal in helicopter hub				X								

P 1	Remove/replace main rotor blade servo flaps				X								
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FIGURE 1-13C Enclosure (3) to Letter of Promulgation CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OST	AP	A	C	F	MAS	OST
Q	FUNDAMENTAL ELECTRICAL MAINTENANCE												
Q 1	Operate prototype electronic test equipment												

Q 1	Remove/replace electric motors												
Q 5	Remove/replace aircraft generators												
Q 6	Remove/replace black boxes (tacsm, radio equipment, etc.)												
Q 7	Connect/disconnect electrical harness												
Q 8	Remove/replace electrical starters												
Q 9	Remove/replace generator (overspeed, starter, etc.)												

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
R	QUALITY ASSURANCE FUNCTIONS												
1	Perform quality assurance (QA) inspection				X							X	
R 4	Investigate recurring maintenance discrepancies to determine cause				X							X	
R 5	Monitor performance of collateral duty inspectors (CDI)				X							X	
R 6	Verify/reverify personnel (plane captain, CDI, etc.)				X							X	
R 7	Conduct engineering investigation of failed engines *DMA												

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Mechanist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OBT	AP	A	C	F	MAS	OBT
S	MAINTENANCE INSPECTION												
S 1	Perform aircraft acceptance/transfer inspections	X						X					X

S 5	Perform aircraft special inspections (7-11 day, etc.)		X						X				X
S 6	Perform aircraft conditional inspections (aircraft, etc., overstress, etc.)		X						X				X
S 7	Perform aircraft inspections (magnetic particle inspections)												
S 8	Perform aircraft inspections (magnetic particle inspections)		X						X				X
S 9	Take aircraft acceleration (G-meter) readings												
S 10	Perform phase maintenance inspections		X						X				X

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OST	AP	A	C	F	MAS	OST
T	TEST CELL OPERATION												
T 1	Make up charts/graphs				X								

T 4	Run test cell run of engine												
T 5	Convert engine readings to "standard-day" parameters										X		
T 6	Adjust engine to manufacturers specifications (test cell)										X		
T 7	Set engine operating base line chart										X		
T 8	Perform pre-operational check on test cell										X		
T 9	Record engine readings during high power/low power runs										X		
T 10	Perform maintenance inspections on test cell										X		

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation

CHANGE 1

Recommended Training Environment for Tasks Performed by Aviation Machinist's Mate (J) and (Recip.)

Duty-Task Identifier	Duty and Task Titles	ADJ Training Environment						ADR Training Environment					
		AP	A	C	F	MAS	OST	AP	A	C	F	MAS	OST
W	CORROSION CONTROL												

3	Prevent corrosion chemically	*DMA											
W	Mask aircraft for painting (tape, paper)	*DMA											
W	Prepare aircraft surfaces for painting (weather, clean, etc.)	*DMA											
W	Apply preservative to aircraft surfaces, components, etc.												
W	Paint surfaces (aircraft, components, etc.)	*DMA											
W	Chemically treat metal after corrosion removal	*DMA											
W	Strip paint from aircraft surfaces	*DMA											
W	Paint aircraft components/part	*DMA											

FIGURE 1-13C

Enclosure (3) to Letter of Promulgation . CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mate (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
A	SUPERVISING AND MANAGEMENT						
A 1	Assign aircraft to flight schedules			3.24	.02	43.50	1.50

A 4	Assign workload priorities	2.50	.02	20.06	.25	66.50	2.50
A 5	Authorize mobilization of aircraft equipment	4.30	.08	6.31	.06	45.50	1.50
A 6	Prepare instructions (maintenance, safety, etc.)	.55		9.71	.09	57.50	1.00
A 7	Prepare request for school quotas	2.44	.03	7.28	.06	21.50	.50
A 8	Write bill of material descriptions	1.88	.02	9.38	.08	40.00	1.00
A 9	Screen work for accuracy/completeness (Mile, M, etc.)	2.79	.03	21.20	.25	47.00	1.00
A 10	Review for completeness ready supply (MORS) list	3.16	.05	13.75	.14	53.00	1.50
A 11	Analyze 3rd summary to determine maintenance trends						
A 12	Review records to determine personnel qualifications	2.17	.02	17.96	.17	49.50	1.00
A 13	Approve/disapprove work requests			3.24	.03	39.50	1.00
A 14	Draft naval message			5.66	.05	40.00	1.00

A 17	Participate in meetings (maintenance, QA, safety, etc.)	6.08	.08	41.91	.50	86.00	3.00
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FIGURE 1-13D Enclosure (4) to Letter of Promulgation
CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Nung (E-7-9)	
		% of Mtrs.	Δ % of Time	% of Mtrs.	Δ % of Time	% of Mtrs.	Δ % of Time
B 1	DIRECTING AND IMPLEMENTING						
B 1	Make work assignments	11.20	.13	46.28	.68	74.00	2.00

B 4	Source documents for accuracy/completeness (NAV's, SAP's, TDS's)	13.82	.22	38.83	.54	57.50	1.50
B 5	Supervise civilian performance evaluations			1.62	.01	13.50	.01
B 6	Prepare civilian performance evaluations	.96	.01	36.57	.44	88.50	3.00
B 7	Prepare/submit the watch, quarter, and standard bill	1.69	.01	9.87	.09	32.50	1.00
B 8	Recommend approval/disapproval of special request cards	.85	.01	25.73	.28	84.50	2.00
B 9	Schedule arrivals/departures, QA audits, FOD walkdown, etc.	7.41	.12	12.30	.14	50.00	1.00
B 10	Prepare delivery requests for in-ut/damaged material			6.96	.05	12.50	.01
B 11	Recommend personnel for advancement in rate	1.10	.01	20.55	.19	73.00	2.00
B 12	Recommend personnel for special programs (Sealer of the Month, Rising Star, etc.)			13.75	.11	74.00	2.00

B 15	Provide technical assistance to other work centers	12.09	.14	31.71	.34	33.00	1.00
B 16	Sign off personnel qualifications (TOS)	5.02	.05	18.61	.20	16.50	.50

FIGURE 1-13D Enclosure (d) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Duty-Task Identifier	Duty and Task Title	Apprentice (E-1-4)		Journeyman (E-5-6)		Sergeant (E-7-9)	
		% of Mhrs.	A % of Time	% of Mhrs.	A % of Time	% of Mhrs.	A % of Time
C	SUPPLY						
C-1	Order publications	4.68	.06	11.00	.11	10.50	.01

4	Package parts/equipment for shipment	23.33	.30	27.12	.34	1.50	.01
C 5	Issue equipment (parts, tools, GSE) accountability	1.10	.03	3.56	.04	2.00	.01
C 6	Identify/locate equipment for repair or inspection (section, unit, cluster, GSE, etc.)	12.42	.16	11.32	.13	1.50	.01
C 7	Place/locate supplies (equipment, parts, etc.)	12.57	.16	13.10	.14	2.50	.01
C 8	Issue parts, tools and equipment	23.66	.28	22.17	.25	1.50	.01
C 9	Package equipment for shipment/storage	7.87	.10	6.47	.07	1.00	.01
C 10	Issue parts/equipment					.50	.01
C 11	Order parts/equipment	49.45	.83	73.30	1.14	32.00	1.00
C 12	Inventory equipment	40.61	.65	60.35	.84	9.00	.01
C 13	Inventory engine accessories	45.42	.71	58.90	.80	8.00	.01
C 14	Place identifying markings (paint, etch, tape, etc.)	26.88	.35	26.54	.29	2.50	.01

FIGURE 1-130 Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
D 1	TRAINING	19.34	.27	38.35	.68	30.50	.50
	Prepare training lectures						

D 5	Conduct training lectures	22.71	.52	46.54	.61	53.00	1.00
D 6	Administer examinations/tests			5.18	.05	18.50	.01
D 7	Maintain training records	8.64	.10	23.62	.29	21.50	.50
D 8	Prepare examinations/tests			5.66	.05	10.50	.01
D 9	Write assignments	3.42	.04	14.08	.14	19.50	.01
	Conduct training aids	3.89	.03	7.12	.06	6.50	.01

CHANGE 1

Enclosure (4) to Letter of Promulgation

FIGURE 1-13D

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (Jet)

Task-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mang (E-7-9)	
		Z of Mhrs.	Δ Z of Time	Z of Mhrs.	Δ Z of Time	Z of Mhrs.	Δ Z of Time
E 1	ADMINISTRATION						
E 1	Investigate accidents/incidents (non-aviation)	.59	.01	2.10	.02	10.00	.01

E 4	Prepare work to work centers	5.46	.05	10.35	.12	55.50	1.50
E 5	File messages, reports, and records	7.25	.10	16.18	.17	39.50	1.00
E 6	Prepare documents for social functions (various functions, etc.)	1.10	.01	7.12	.06	19.00	.50
E 7	Prepare messages	2.31	.06	18.44	.16	65.50	2.00
E 8	Update the report bill	6.41	.07	14.56	.14	32.50	1.00
E 9	Update messages/instructions	9.29	.15	29.93	.33	38.50	1.00
E 10	Maintain status board	5.13	.07	16.02	.19	50.50	
E 11	Change air's classification					3.00	.01
E 12	Out standing	9.46	.09	9.54	.08	5.50	.01
E 13	Construct status board	1.30	.03	3.72	.02	12.00	.01
E 14	Conduct investigations of discipline cases			2.26	.01	27.50	.50
E 15	Review (chop) outgoing correspondence/messages			2.10	.02	24.50	.50

FIGURE 1-13D

Enclosure (4) to Letter of Promulgation

CHANGE 1

Degrees of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mag (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
F 1	FUNDAMENTAL AVIATION MAINTENANCE						
F 1	Safety wire aircraft component (rotor)	93.44	2.21	96.44	1.73	17.50	.01

F 4	Inspect/repair aircraft equipment/parts	7.02	.08	6.13	.06	1.00	.01
F 5	Remove/replace low point drains	43.10	.52	43.85	.50	1.00	.01
F 6	Inspect/maintain safety equipment for proper operation (radiators, fire extinguishers, flight deck, etc.)	3.64	.08	7.60	.08	9.00	.01
F 7	Remove/replace wing, gaskets, hoses, etc.	93.78	2.09	93.69	1.72	7.50	.01
F 8	Remove/replace fuel/light bulbs/switches	5.65	.06	9.87	.09	2.50	.01
F 9	Attach/remove aircraft antennas	60.17	.91	52.59	.67	7.00	.01
F 10	Attach/remove aircraft protective covers	54.62	.78	54.04	.67	6.50	.01
F 11	Fuel/defuel aircraft	41.77	.68	41.26	.53	5.00	.01
F 12	Take fuel samples	31.10	.48	28.64	.35	4.00	.01
F 13	Take oil samples	68.72	1.37	59.38	.84	2.50	.01
F 14	Take hydraulic fluid samples	4.60	.05	6.31	.06	2.00	.01

F 18	Load/unload cargo or baggage from aircraft	7.34	.09	10.52	.10	4.00	.01
F 18	Wash/clean aircraft	24.44	.36	16.18	.20	1.00	.01

FIGURE 1-130 Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jat)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Nung (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
G 1	AVIATION LINE MAINTENANCE						
G 1	Dig-check fuel tanks	9.32	.12	9.38	.10	2.50	.01

G 1	Push daily/pre-operational check on ground support equipment (yellow gear)	15.21	.19	14.40	.17	3.00	.01
G 6	Direct aircraft using standard aircraft taxi hand signals	19.39	.21	21.68	.23	5.50	.01
G 7	Install aircraft downlocks, jury struts, safety pins, groundling wires	44.25	.51	40.61	.46	6.50	.01
G 8	Check aircraft/pod locks	56.30	.78	44.01	.53	3.50	.01
G 9	Remove aircraft/pod locks	70.03	1.10	53.24	.68	1.00	.01
G 10	Push aircraft	18.54	.20	17.96	.18	2.50	.01
G 11	Tow aircraft	32.84	.45			5.00	.01
G 12	Act as safety observer during aircraft movement (walk wings)	64.73	1.16	60.84	.82	21.00	.01
G 13	Install drag chutes in aircraft	1.65	.01	2.75	.03		
G 16	Turn-up aircraft	55.00	1.18	55.00	1.18	18.50	.01

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mag (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
E 1	MAINTENANCE ADMINISTRATION Fill out support action forms (SAP's)	66.75	1.07	75.56	1.12	17.50	.50

E 4	Make entries in aircraft/engine log book	6.74	.05	5.34	.05	15.00	.01
E 5	Prepare public works work request	2.05	.01	12.46	.10	29.00	.50
E 6	Prepare aircraft passenger/cargo manifests			4.53	.04	8.50	.01
E 7	Fill out number accounting (NMA) cards	11.06	.13	20.22	.23	6.50	.01
E 8	Fill out customer service work requests	3.94	.03	17.64	.16	26.50	.50
E 9	Make shop log records	8.20	.09	24.11	.27	29.50	1.00
E 10	Prepare aircraft reports (UR's, A/C incident, etc.)	6.27	.09	33.01	.35	42.50	1.00
E 11	Fill out equipment status data (FSD) cards	1.09	.01	4.04	.03	30.50	1.00
E 12	Update visual information display system (VIDS board)	9.47	.11	27.34	.33	56.50	1.50
E 13	Fill out maintenance action form (MAF's)	55.18	1.05	72.00	1.22	25.00	.50
E 14	Fill out technical inspection compliance forms (TDC's)	6.70	.08	25.89	.28	17.00	.01
E 15	Fill out configuration control forms (CCF)	.80	.01	2.42	.02	11.50	.01

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Job-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mentor (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
J 1	GENERAL POWER PLANT MAINTENANCE						
J 1	Remove/replace flexible shafts	21.03	.29	30.26	.36	4.50	.01

J 4	Remove/replace throttle quadrants	62.36	1.03	60.84	.82	5.00	.01
J 5	Rebuild engine mounts	14.73	.18	15.53	.15	.50	.01
J 6	Service engine in oil coolers	4.04	.03	4.37	.04	1.00	.01
J 7	Remove/replace starters in fuel cells	29.14	.44	26.21	.34	1.00	.01
J 8	Service/overhaul speed drive (CSD)	71.31	1.56	50.81	.84		
J 9	Remove/replace cable pulleys	7.42	.07	12.78	.12	2.00	.01
J 10	Can/wash engine	15.48	.21	20.71	.24	2.50	.01
J 11	Clean and flush engine hydraulic, fuel, etc.)	23.60	.27	26.37	.28	.50	.01
J 12	Weld arc (gas shield) weld joints					2.50	.01
J 13	Acetylene weld joints						
J 14	Electric ABC weld joints						
J 15	Pressure check fuel system	63.42	1.07	58.74	.83	2.00	.01

FIGURE 1-13D Enclosure to Letter of Promulgation **CHANGE 1**

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mag (E-7-9)	
		% of Mtr.	% of Time	% of Mtr.	% of Time	% of Mtr.	% of Time
E 1	JET ENGINE MAINTENANCE						
E 1	Rebuild engine mounted gear boxes	2.26	.04	4.20	.04	1.00	.01

E 5	Remove/replace afterburner flaps/rollers/seals	15.53	.20	12.13	.15	1.00	.01
E 6	Remove/replace afterburner flame holder	17.21	.21	12.94	.14	.50	.01
E 7	Adjust afterburner nozzle opening (sizing)	19.94	.30	13.59	.17	1.00	.01
E 8	Adjust/replace flame	17.08	.24	13.91	.16		
E 9	Thrust/adjust/replace	9.36	.10	10.84	.12		
E 10	Remove/replace air control (VAC) to nozzle opening	21.18	.32	14.24	.20		
E 11	Remove/replace engine bearings	7.60	.07	13.27	.14	.50	.01
E 12	Remove/replace combustion chambers (bearing case)	16.60	.04	22.49	.25	.50	.01
E 13	Check combustion chamber burner spray pattern	6.01	.06	9.71	.10	.50	.01
E 14	Service auxiliary power units (APU)	10.95	.20	19.09	.29	1.00	.01
E 15	Remove/replace fuel flow divider block	4.99	.04	9.54	.09		
E 16	Remove/replace fuel manifold assembly	32.53	.44	34.14	.39		
E 17	Remove/replace compressor rotors	5.14	.04	7.76	.08	.50	.01
E 18	Remove/replace compressor rotor blades/segment	1.65	.01	5.50	.05		

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Det)

Task-Task Identifier	Duty and Task Titles	Apprentice (B-1-4)		Journeyman (B-5-6)		Supv/Mngs (B-7-9)
		% of Mhrs.	Δ% of Time	% of Mhrs.	Δ% of Time	
L 1	RECIPROCATING ENGINE MAINTENANCE	10.56				
L 1	Remove/replace engine cooling baffles		.14	10.87	.13	.50
						.01

L 5	Remove/replace magnetos	2.01	.03	4.53	.06	
L 6	Remove/replace spark plugs	12.86	.22	16.66	.21	1.00
L 7	Remove/replace reciprocating engine cylinders			2.91	.02	1.00
L 8	Remove/replace distributors	3.54	.05	4.37	.04	
L 9	Perform magnetos check	1.30	.04	1.46	.02	1.00
L 10	Repack magnetos	1.10	.01			
L 11	Adjust carburetors	1.85	.02	1.94	.02	
L 12	Time reciprocating engine	1.00	.02	2.75	.02	
L 13	Rebuild distributors by replacing component parts	1.35	.01	1.46	.01	

FIGURE 1-13D

Enclosure (s) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
M 1	INFLIGHT REFUELING SYSTEMS						
M 1	Remove/replace hydraulic motors	8.41	.11	7.12	.08		

M 5	Remove/replace pulloctine assembly (IIR)	3.81	.03	2.75	.02		
M 6	Rebuild pulloctine assembly (IIR)	4.01	.03	3.88	.04		
M 6	Remove/replace hose reel assembly (IIR)	5.42	.06	5.34	.06	1.00	.01
M 7	Rebuild drag assembly	11.37	.15	8.90	.11	1.00	.01
M 8	Remove/replace fuel hose	8.34	.12	6.31	.08	.50	.01
M 9	Remove/replace drag assembly	9.04	.14	5.66	.07	.50	.01
M 10	Adjust hose reel assembly						

FIGURE 1-13D

Enclosure (4) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ% of Time	% of Mhrs.	Δ% of Time	% of Mhrs.	Δ% of Time
N 1	PROPELLER MAINTENANCE						
N 1	Rebuild propeller governors	1.67	.02	2.42	.02	3.00	.01

N 5	Remove/replace brush block assembly	15.32	.31	21.84	.38	3.50	.01
N 6	Remove/replace propeller dome (spinner)	.80	.01				
N 7	Remove/replace blade limit switches	3.47	.04	3.88	.04	.50	.01
N 8	Remove/replace propeller blades	11.64	.22	18.12	.31	4.00	.01
N 9	Remove/replace propeller valve housing	7.13	.10	9.87	.13	.50	.01
N 10	Align propeller blades	5.00	.07	5.18	.06	.50	.01
N 11	Perform top test on propeller blades	6.11	.09	5.66	.08		
N 12	Balance propeller	.80	.01	1.29	.01		
N 13	Remove/replace propeller governor	5.81	.08	8.58	.10		
N 14	Adjust propeller governor	7.08	.10	10.35	.12	.50	.01
N 15	Remove/replace propeller assembly	13.46	.26	19.58	.33	2.00	.01
N 16	Flush/desludge propeller dome assembly	4.16	.08	5.82	.08	1.00	.01

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHAS-7F

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
P	GENERAL HELICOPTER MAINTENANCE						
P 1	Fold helicopter blades	4.40	.04	6.63	.06	1.00	.01

P 2	Remove/replace tail rotor assembly	3.16	.04	8.58	.08	1.29	.01
P 3	Service helicopter transmissions	5.24	.05	8.41	.08	.50	.01
P 6	Remove/replace right angle drive (power turbine)	1.00	.01	9.54	.10		
P 7	Remove/replace main rotor transmissions	6.90	.06	9.87	.10		
P 8	Remove/replace drive train gear boxes (tail, intermediate, etc.)	4.25	.03				
P 9	Remove/replace rotor blades	4.25	.04	9.87	.10		
P 10	Remove/replace helicopter drive shaft sections	2.47	.02	4.20	.04	.50	.01
P 11	Remove/replace drive shaft pin	2.25	.02	5.18	.05		
P 12	Remove/replace wash plate	2.20	.02	6.47	.07		
P 13	Remove/replace helicopter rotor blades	2.75	.02	4.69	.04		
P 14	Track rotor blades						
P 15	Replace wear/light on helicopter blades			1.29	.01		

P 15	Remove/replace main rotor blade servo flaps	1.25	.02				
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FIGURE 1-13D Enclosure (4) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)
		% of Mbrs. Δ % of Time	% of Mbrs. Δ % of Time	% of Mbrs. Δ % of Time	% of Mbrs. Δ % of Time	
Q	FUNDAMENTAL ELECTRICAL MAINTENANCE					
Q 1	Operate prototype electronic test equipment	9.12	.15	13.59	.17	1.50 .01

Q 4	Remove/replace electric motors	2.12	.04			
Q 5	Remove/replace aircraft generators	28.92	.37	38.51	.54	.50 .01
Q 6	Remove/replace black boxes (tacam, radio control, etc.)	2.26	.02	6.31	.06	.50 .01
Q 7	Connect/disconnect electrical harness	30.50	.43	32.20	.37	.50 .01
Q 8	Remove/replace electrical starters	16.58	.32	15.05	.20	
Q 9	Remove/replace propellers (overspeed, starter, etc.)	21.72	.31			

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
R 1	QUALITY ASSURANCE FUNCTIONS Perform quality assurance (QA) inspections	3.06	.05	12.62	.17	17.50	.50

R 4	Investigate recurring maintenance discrepancies to determine cause	4.95	.07	21.36	.24	54.00	1.50
R 5	Monitor performance of collateral duty inspectors (CDI)	.25	.00	13.43	.14	28.50	.50
R 6	Qualify/requalify personnel (place captain, etc.)	2.06	.02			19.50	.50
R 7	Conduct engineering investigation of engine failure	1.10	.01	1.62	.01	2.50	.01

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mentors (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
S 1	MAINTENANCE INSPECTION						
S 1	Perform aircraft acceptance/transfer	39.00	.92	62.62	.87	19.50	.50

S 4	Perform aircraft special inspections (7-14 day, etc.)	70.55	1.52	72.33	1.30	15.50	.01
S 5	Perform aircraft conditional inspections (load limits, overstress, etc.)	37.22	.55	45.63	.56	14.00	.01
S 6	Perform structural inspections	10.11	.13	10.03	.11		
S 7	Perform engine particle inspections (engine oil)	8.35	.15	8.09	.11	3.50	.01
S 8	Perform engine oil inspections	37.87	.56	45.30	.52	13.50	.01
S 9	Take aircraft acceptance (G-meter) readings	3.75	.04	2.75	.02	1.00	.01
S 10	Perform post maintenance inspections	49.35	.94	51.46	.82	15.10	.01

FIGURE 1-130

Enclosure (4) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mag (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
T 1	TEST CELL OPERATION						
T 1	Make up charts/graphs	1.30	.01	5.50	.05	23.50	.01

T 4	Conduct test cell run of engine						
T 5	Convert engine readings to "standard-day" parameters	4.11	.05	11.32	.12	3.50	.01
T 6	Adjust engine to manufacturer's specifications	5.62	.08				
T 7	Plot engine operating base line chart	1.71	.03	4.37	.04	1.50	.01
T 8	Perform pre-operational check on test cell			2.42	.02		
T 9	Backed engine power in varying high power/low power runs	18.30	.34	45.95	.68	2.50	.01
T 10	Perform maintenance inspections on test cell	2.26	.04	3.07	.04		

FIGURE 1-13D

Enclosure (4) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
U 3	Chief/Debrief pilot or aircrew	8.22	.08	15.86	.17	34.00	1.00

FIGURE 1-13D

Enclosure (4) to Letter of Promulgation

CHANGE 1

SAMPLE

Degrees of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mng (E-7-9)	
		% of T.Ts.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
W 1	CORROSION CONTROL						
W 1	Inspect aircraft for corrosion	32.68	.66	42.88	.64	16.00	.01

W 4	Paint aircraft for painting (tape, paper)	2.81	.03	2.91	.03		
W 5	Prime aircraft surfaces for painting (weather seal, etc.)	1.16	.01	1.62	.02		
W 6	Polysynthetic to aircraft surfaces, components, etc.	11.52	.15	14.08	.16	1.00	.01
W 7	Prime surfaces/aircraft, components, etc.)	3.20	.03	2.91	.03		
W 8	Chemical treat after corrosion removal	5.42	.05	5.18	.05		
W 9	Strip paint for aircraft surfaces	1.10	.01				
W 10	Paint aircraft components/parts	.80	.01	2.10	.02	.50	.01

FIGURE 1-13D

Enclosure (4) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (Jet)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Surv/Mans (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
X	GENERAL MILITARY DUTIES						
X 1	Conduct zone inspections	2.95	.06	5.34	.06	39.50	1.00

X 5	Escort inspection parties	1.26	.02	4.04	.04	14.50	.50
X 6	Muster personnel	6.30	.10	45.95	.60	57.50	

FIGURE 1-13D Enclosure (4) to Letter of Promulgation CHANGE 1

SAMPLE

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier		Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mgmt (E-7-9)	
			% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
SUPERVISING AND MANAGEMENT								
A		Assign aircraft to flight schedules	2.32	.02	8.03	.06	7.50	.14
A 2		Make personnel assignments (flight crews, training, deployments, etc.)	5.81	.08	20.53	.19	37.50	.81
OPERATIONAL								
A 6		Prepare instructions (maintenance, safety, etc.)	1.16	.01	16.07	.10	60.00	1.23
A 7		Prepare request for school quotas	1.16	.01	5.36	.04	30.00	.66
A 8		Write flight job descriptions			12.50	.10	47.50	.88
A 9		Prepare 30-day forecasts for accuracy/completeness (MRC, SAF, etc.)	1.16	.01	31.25	.33	42.50	.86
A 10		Review and periodically ready supply (NORS) list	1.69	.02	17.86	.18	22.50	.54
A 11		Analyze MRC summaries to determine maintenance trends			11.60	.10	35.00	.79
ADMINISTRATIVE								
A 15		Screen man hour accounting cards	1.16	.01	15.18	.12	20.00	.34
A 16		Screen maintenance requirement cards	1.16	.02	28.57	.28	35.00	.63
A 17		Participate in meetings (maintenance, Q, safety, etc.)			50.89	.48	90.00	2.49
A 18		Arrange transportation, berthing, etc. for visiting personnel	1.16	.01	2.68	.02	17.50	.50
A 19		Recommend changes to maintenance requirement card (MRC)			18.75	.12	45.00	.64

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mgmt (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
DIRECTING AND IMPLEMENTING							
B 1	Make work assignments	11.62	.09	64.28	.84	57.50	1.61
B 2	Sign off record of practical factors	8.14	.09	65.18	.54	70.00	1.10
MAINTENANCE							
B 3	Perform civilian performance evaluations			37.36	.05	17.30	.62
B 6	Perform enlisted performance evaluations	1.16	.02	57.14	.54	90.00	2.48
B 7	Prepare/update the watch, quarter, and station bill			19.64	.13	40.00	.82
B 8	Recommend approval/disapproval of special request chits			39.28	.37	72.50	1.65
B 9	Schedule maintenance training, QA audits, FOD walkdown, etc.)	5.81	.08	16.07	.14	65.00	1.68
B 10	Report survey requests for lost/damaged material			6.25	.05	10.00	.19
B 11	Recommend personnel for advancement in rate			29.46	.26	72.50	1.53
PERSONNEL							
B 14	Recommend personnel for promotion/duty/quality assurance inspector			25.00	.20	52.50	.89
B 15	Provide technical assistance to other work centers	6.98	.08	39.28	.35	45.00	1.10
B 16	Sign off personnel qualifications (PQS)	2.32	.03	17.86	.18	42.50	.96

FIGURE 1-13E Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mng (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
SUPPLY							
C 1	Order publications			17.86	.14	30.00	.58
C 2	Screen parts to determine repair capability	4.65	.03	17.86	.16	17.50	.47
REPAIR							
C 6	Pick up/turn-in equipment for repair or inspection (bottles, carts, chutes, GSE, etc.)	18.60	.18	6.25	.05	7.50	.13
C 7	Pick up/deliver supplies (equipment, parts, etc.)	9.30	.08	13.39	.14	7.50	.16
C 8	Store parts, supplies, and equipment	22.09	.26	16.07	.13	12.50	.24
C 9	Package damaged equipment for shipment/storage	2.32	.03	3.57	.02		
PAINTING							
C 13	Inventories engine accessories	38.37	.48	57.14	.62	5.00	.10
C 14	Place identifying marks on tools (paint, etch, tape, etc.)	26.74	.26	25.00	.24		

FIGURE 1-13E

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
	TRAINING						
D 2	Prepare training lectures	15.12	.16	43.75	.41	50.00	1.01
	Grade examinations/tests			10.71	.11	42.50	.69
D 6	Maintain training records	13.95	.18	35.71	.36	47.50	1.20
D 7	Prepare examinations/tests			8.03	.07	30.00	.47
D 8	Write lesson guides	5.81	.05	24.10	.21	30.00	.54
D 9	Instruct training aids	9.30	.10	10.71	.08	2.50	.04

FIGURE 1-13E

Enclosure (5) to Letter of Profulgation CRANCE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mngt (E-7-9)	
		Z of Mhrs.	Δ % of Time	Z of Mhrs.	Δ % of Time	Z of Mhrs.	Δ % of Time
E	ADMINISTRATION						
E	Investigate accidents/incidents (non-aviation)	1.16	.01			10.00	.15
E 5	File messages, reports, and records	5.81	.07	22.32	.20	50.00	1.30
E 6	Make arrangements for social functions (parties, banquets, etc.)	5.81	.04	9.82	.08	17.50	.51
E 7	Prepare memorandums	5.81	.05	22.32	.14	70.00	1.70
E 8	Understand the rail bill	4.65	.04	16.96	.13	47.50	1.07
E 9	Check publications/instructions	6.98	.08	33.03	.29	55.00	1.24
E 10	Train in signals boards	4.65	.05	17.86	.18	22.50	
E 14	Conduct investigations of disciplinary cases			7.14	.05	5.00	.05
E 15	Review (chop) outgoing correspondence/messages			1.78	.02	22.50	.45

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (B)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Maint (E-7-9)	
		% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time
	FUNDAMENTAL AVIATION MAINTENANCE						
F 1	Safety wire aircraft component (rotor assemblies, engines, engine accessories, etc.)	100.00	1.65	98.21	1.22	17.50	.22
F 5	Repair/replace low point drains	53.49	.72	74.10	.71	2.50	.02
F 6	Inspect/test safety equipment for proper operation (respirators, fire extinguishers, flight deck gear, etc.)	12.79	.13	10.71	.07	12.50	.24
F 7	Remove/replace "O" rings, gaskets, hoses, etc.	94.18	1.66	96.43	1.28	2.50	.04
F 8	Remove/replace hoses/light bulbs/knobs	18.60	.18	24.10	.11	7.50	.12
F 9	Attach/remove aircraft tie-downs	75.58	.95	69.64	.71	20.00	.32
F 10	Attach/remove aircraft protective covers	33.72	.38	33.93	.33	20.00	.32
F 11	Fuel/refuel aircraft	56.98	.86	67.86	.68	10.00	.20
F 15	Attach/remove aircraft turn-up screens	6.98	.08	4.46	.03		
F 16	Stow parachutes in aircraft	6.98	.06	10.71	.06		
F 17	Load/unload cargo or baggage from aircraft	19.76	.24	27.68	.23	7.50	.29
F 18	Wash/clean aircraft	48.84	.76	31.25	.30	12.50	.24

FIGURE 1-13E Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
	AVIATION LINE MAINTENANCE						
G 1	Dip-check fuel tanks	25.58	.30	33.93	.30	12.50	.21
G 2	Remove/replace aircraft batteries	8.14	.06	16.07	.10		
G 3	Service struts	10.44	.06	15.18	.08	2.50	.05
G 4	Paint aircraft using standard aircraft taxi hand signals	47.67	.68	49.10	.46	22.50	.39
G 5	Install/remove aircraft downlocks, jury struts, safety and grounding wires	66.28	.88	53.57	.52	20.00	.32
G 6	Check aircraft bull chocks	69.76	.89	58.03	.57	22.50	.36
G 7	Recheck aircraft tires	67.44	.84	59.82	.57	17.50	.31
G 8	Wash aircraft	39.53	.40	29.46	.26	10.00	.18
G 9	Tow aircraft	47.67	.62	39.28	.36	15.00	.23
G 10	Turn-up aircraft	75.58	1.29	75.89	1.16	22.50	.42
G 11	Stand by aircraft with fire bottle during fueling/starting	81.39	1.24	66.96	.73	17.50	.29
G 12	Clean/polish aircraft windshields or canopies	30.23	.38	28.57	.26	10.00	.14
G 13	Remove/replace brake assemblies	15.12	.17	14.28	.07		
G 14	Service pneumatic system storage bottles	4.65	.03				

FIGURE 1-13E Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (A)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mgt (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
MAINTENANCE ADMINISTRATION							
H 1	Fill out support action forms (SAF's)	66.28	.92	79.46	.93	27.50	.46
H 2	Fill out visual information display system (VIDS) cards/ production control register cards	10.46	.11	48.21	.58	37.50	1.01
OPERATIONS							
H 6	Prepare aircraft passenger/cargo manifests	4.65	.06	8.03	.05		
H 7	Fill out man hour accounting (MHA) cards	12.79	.14	29.46	.27	12.50	.25
H 8	Fill out customer service work requests			20.53	.17	17.50	.31
H 9	Maintain log books/records.	6.98	.08	36.60	.36	37.50	.74
H 10	Prepare special reports (UR's, A/C incident, etc.)	6.98	.06	48.21	.43	42.50	.92
TRAINING							
H 14	Fill out technical identification compliance forms (TDC's)	8.14	.10	37.50	.35	15.00	.26
H 15	Fill out configuration control forms (CCF)	1.16	.01	2.68	.02		

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (B)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mans (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
	GENERAL POWER PLANT MAINTENANCE						
J 1	Remove/replace flexible shafts	44.18	.66	50.89	.45	2.50	.02
J 2	Remove/replace transmitters (hydraulic, fuel flow, etc.)	33.72	.35	43.75	.36	12.50	.15
J 3	Remove/replace ignition harnesses	73.25	.94	83.93	.87	10.00	.16
J 4	Remove/replace throttle quadrants	51.16	.66	56.25	.46	10.00	.18
J 8	Service constant speed drive (CSD)	29.07	.46	28.57	.27	2.50	.06
J 9	Remove/replace cable pulleys	32.56	.36	43.75	.45		
J 10	Remove/replace engine	18.60	.23	17.86	.17	2.50	.05
J 11	Clean fuel pump lines (hydraulic, fuel, etc.)	38.37	.45	38.39	.33		
J 12	Remove/replace shielded weld metals	2.32	.01	1.78	.01	2.50	.06
J 13	Acetylene weld metals	2.32	.01			5.00	.09
J 17	wear, etc.)	54.65	.82	67.86	.82	22.50	.42
J 18	Perform score scope inspections (engine drive shafts, etc.)	62.79	.82	81.25	.96	7.50	.15
J 19	Remove/replace tachometer generator	19.76	.16	32.14	.23		
J 19	Remove/replace fire detection elements	5.81	.06	15.18	.09		

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Super/Mang (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
JET ENGINE MAINTENANCE							
K 1	Rebuild engine mounted gear boxes	1.16	.02	6.25	.07		
K 2	Water wash engines using distilled water and solvents	37.21	.55	22.32	.18	5.00	.07
K 3	Blend power turbine blades			5.36	.04		
K 4	Remove/replace afterburner spray bar						
SAFETY							
K 8	Adjust igniter plugs	2.32	.02	3.57	.02		
K 9	Adjust liquid jet engines			3.57	.03	2.50	.02
K 10	Remove/replace control (MAC) to nozzle opening						
K 11	Remove/replace engine bearings			2.68	.02		
K 12	Remove/replace combustion chambers (burner cans)			4.46	.04		
K 13	Check combustion chamber for spray pattern			2.68	.02		
SAFETY							
K 17	Remove/replace compressor rotors			1.78	.02		
K 18	Remove/replace compressor rotor blades/segments			1.78	.02		
K 19	Blend compressor rotor blades			6.25	.05		

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supt/Ment (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
RECIPROCATING ENGINE MAINTENANCE							
L	Remove/replace engine cooling baffles	77.90	.98	75.00	.76	5.00	.06
L 2	Remove/replace ignition coils	67.44	.86	69.64	.67	10.00	.15
L 3	Rebuild carburetors	6.98	.09	14.28	.16	5.00	.05
L 4	Remove/replace carburetors	88.37	1.30	82.14	.96	10.00	.18
IGNITION SYSTEM MAINTENANCE							
L 8	Remove/replace distributors	36.04	.45	49.10	.51	7.50	.14
L 9	Adjust magnet drop check	67.44	1.05	70.53	.99	17.50	.27
L 10	Repair push rod housing	88.37	1.39	85.71	1.06	2.50	.03
L 11	Adjust carburetor	76.74	1.04	81.25	.94	7.50	.06
L 12	Time recharging engines	70.93	1.08	77.68	.90	7.50	.14
L 13	Rebuild distributors by replacing component parts	6.98	.09	6.25	.04		

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mng (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
M 1	INFLIGHT REFUELING SYSTEMS						
M 2	Remove/replace hydraulic motors	6.98	.06	14.28	.10	2.50	.01
M 3	Remove/replace inflight refueling (IFR) probes	2.32	.04	3.68	.04		
M 4	Test/inspect inflight refueling (IFR) probes			1.78	.01		
M 5	Rebuild engine assembly					2.50	.02
M 6	Remove/replace IFR fuel hose			2.68	.02	2.50	.02
M 7	Remove/replace engine assembly					2.50	.02
M 8	Adjust engine assembly			1.78	.01	2.50	.02

FIGURE 1-13E Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (E)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
PROPELLER MAINTENANCE							
N 1	Rebuild propeller governors	5.81	.03	8.03	.05	2.50	.03
N 2	Dress propeller blades	63.95	.75	78.57	.75	7.50	.10
N 6	Remove/replace blade limit switches	3.49	.03	8.03	.06		
N 7	Remove/replace propeller blades	10.46	.13	9.82	.08	2.50	.05
N 8	Remove/replace propeller valve housing	24.42	.26	37.50	.40		
N 9	Remove/replace propeller blades	58.14	.76	47.32	.52		
N 10	Perform "tap" test on propeller blades			3.57	.03	2.50	.05
N 14	Adjust propeller governor	60.46	.85	76.78	.89	2.50	.02
N 15	Remove/replace propeller governor	66.28	.96	76.78	.91	5.00	.08
N 16	Flush/desludge propeller dome assembly	58.14	.84	66.96	.69	5.00	.06

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanic's Mate (H)

Duty-Task Identifier		Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Serp/Mate (E-7-9)	
			Σ of Hrs.	Δ % of Time	Σ of Hrs.	Δ % of Time	Σ of Hrs.	Δ % of Time
GENERAL HELICOPTER MAINTENANCE								
P 1		Fold helicopter blades	2.32	.03	4.46	.05	5.00	.10
P 2		Remove/replace shaft couplings	13.95	.14	16.07	.12		
ENGINE MAINTENANCE								
P 3		Remove/replace right angle drive (power turbine)	2.32	.01	5.36	.04		
P 4		Remove/replace main rotor transmissions	3.49	.03	6.25	.05		
P 5		Remove/replace drive train gear boxes (tail, intermediate, etc.)	3.49	.04	7.14	.06		
P 6		Remove/replace rotor heads	3.49	.04	5.36	.04		
P 7		Remove/replace helicopter drive shaft sections	4.65	.05	5.36	.05	2.50	.05
P 8		Remove/replace drive shaft joints	2.32	.02	1.78	.01		
P 9		Remove/replace swashplates	4.65	.05	5.36	.03		
ROTOR MAINTENANCE								
P 10		Perform x-ray inspections	2.32	.02	1.78	.01		
P 11		Balance tail rotor assembly			1.78	.01		
P 12		Remove/replace main rotor blade servo fins			2.68	.02		

FIGURE 1-13E Enclosure (5) to Letter of Promulgation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mngt (E-7-9)	
		% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time
	FUNDAMENTAL ELECTRICAL MAINTENANCE						
Q 1	Operate prototype electronic test equipment			12.50	.08		
Q 2	Install connectors/cannon plugs on cable (solder/crimp)	17.44	.13	16.96	.11	2.50	.02
Q 3	Remove/replace black boxes (vacan, radio control, etc.)	4.65	.02	15.18	.09		
Q 4	Connect/disconnect electrical harness	9.30	.08	29.46	.22		
Q 5	Remove/replace electrical starters	19.76	.22	31.25	.26		
Q 9	Remove/replace solenoids (overspeed, starter, etc.)	6.98	.04	7.14	.06		

FIGURE 1-13E Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)			Journeyman (E-5-6)			Supv/Mans (E-7-9)		
		Σ of Hrs.	Δ % of Time	Σ of Time	Σ of Hrs.	Δ % of Time	Σ of Time	Σ of Hrs.	Δ % of Time	Σ of Time
R 1	QUALITY ASSURANCE FUNCTIONS									
R 2	Perform quality assurance (QA) inspections				16.96	.16		25.00		.75
R 3	Perform collateral duty (CDI) inspections	11.62	.19		79.46	1.22		22.50		.32
R 4	Monitor performance of collateral duty inspectors (CDI)				17.86	.20		40.00		.91
R 5	Qualify/requalify personnel (plane captain, CDI, etc.)	8.14	.08		12.50	.12		52.50		1.45
R 6	Conduct engineering investigation of failed engines									

FIGURE 1-13B

Enclosure (5) to letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	% of Time	% of Mhrs.	% of Time	% of Mhrs.	% of Time
	MAINTENANCE INSPECTION						
S 1	Perform aircraft acceptance/transfer inspections	59.30	.88	77.68	.82	20.00	.36
S 2	Perform aircraft calendar inspections	75.57	1.29	57.14	.72	20.00	.36
S 3	Perform aircraft daily inspections	36.04	.57	41.96	.47	22.50	.41
<hr/>							
S 6	Perform ultrasonic inspections	5.81	.07	8.03	.08		
S 7	Perform magnetic particle inspections (magna flux)	10.46	.13	15.18	.14	2.50	.02
S 8	Perform dye penetrant inspections	34.88	.49	50.00	.42	10.00	.16
S 9	Take aircraft accelerometer (G-meter) readings	9.30	.13	5.36	.03		
S 10	Perform power maintenance inspections	39.53	.66	46.43	.54	22.50	.41

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time
	TEST CELL OPERATION						
T 1	Make up charts/graphs	4.65	.04	8.93	.08	27.50	.51
T 2	Prepare (dress) engine for test cell runs			2.68	.03		
T 3	Install engine on test bed/stand	9.30	.10	4.46	.04		
<hr/>							
T 4	Plot engine operating base line chart					2.50	.02
T 8	Perform pre-operational check on test cell	1.16	.02				
T 9	Record engine readings during high power/low power runs	30.23	.40	39.28	.39	5.00	.10
T 10	Perform engine inspections on test cell			3.57	.03		

FIGURE 1-13E Enclosure (5) to Letter of Promoukation CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time	% of Mbrs.	Δ % of Time
U	IN-FLIGHT DUTIES						
	Monitor cockpit gauges in flight	16.28	.24	24.10	.36	12.50	.34
		16.28	.20	19.64	.21	10.00	.17

SAMPLE

Enclosure (5) to Letter of Promulgation

FIGURE 1-13E

CHANGE 1

AD-A060 680

CHIEF OF NAVAL TECHNICAL TRAINING MILLINGTON TN F/G 5/9
PROCEDURES FOR THE PLANNING, DESIGN, DEVELOPMENT, AND MANAGEMEN--ETC(U)
APR 76

F/G 5/9

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2 OF 5
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060680



Degree of Task Involvement Summary by Skill Levels of the Aviation Machinist's Mate (R)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)			Journeyman (E-5-6)			Supv/Mang. (E-7-9)		
		% of Mhrs.	Δ % of Time	% of Time	% of Mhrs.	Δ % of Time	% of Time	% of Mhrs.	Δ % of Time	% of Time
	CORROSION CONTROL									
W 1	Inspect aircraft for corrosion	33.72	.44		29.46	.30		35.00	.86	
W 2	Remove corrosion mechanically (Vacuublast, tyrodwheel, etc.)	9.30	.10		9.82	.06		2.50	.02	
W 3	Remove corrosion chemically	9.30	.10		6.25	.04				
W 4	Mask aircraft for painting (tape, paper)	8.14	.06		6.25	.04				
W 5	Paint surfaces (aircraft, components, etc.)	10.46	.08		8.93	.06		2.50	.02	
W 6	Chemically treat metal after corrosion removal	2.32	.01		3.57	.02				
W 7	Strip paint from aircraft surfaces									
W 8	Paint aircraft components/parts	5.81	.06		7.14	.05		2.50	.02	
W 9										
W 10										

FIGURE 1-13E

Enclosure (5) to Letter of Promulgation

CHANGE 1

Degree of Task Involvement Summary by Skill Levels of the Aviation Mechanist's Mate (E)

Duty-Task Identifier	Duty and Task Titles	Apprentice (E-1-4)		Journeyman (E-5-6)		Supv/Mang (E-7-9)	
		% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time	% of Mhrs.	Δ % of Time
X 1	GENERAL MILITARY DUTIES						
X 2	Conduct zone inspections	2.32	.02	5.36	.03	25.00	.46
X 4	Sustain Division Officer's notebook			2.36	.04	37.50	.74
X 5	Report inspection parties			4.46	.03	15.00	.30
X 6	Master personnel	15.12	.14	50.89	.52	77.50	2.10

SAMPLE

Enclosure (5) to Letter of Promulgation CHANGE 1

FIGURE 1-13E

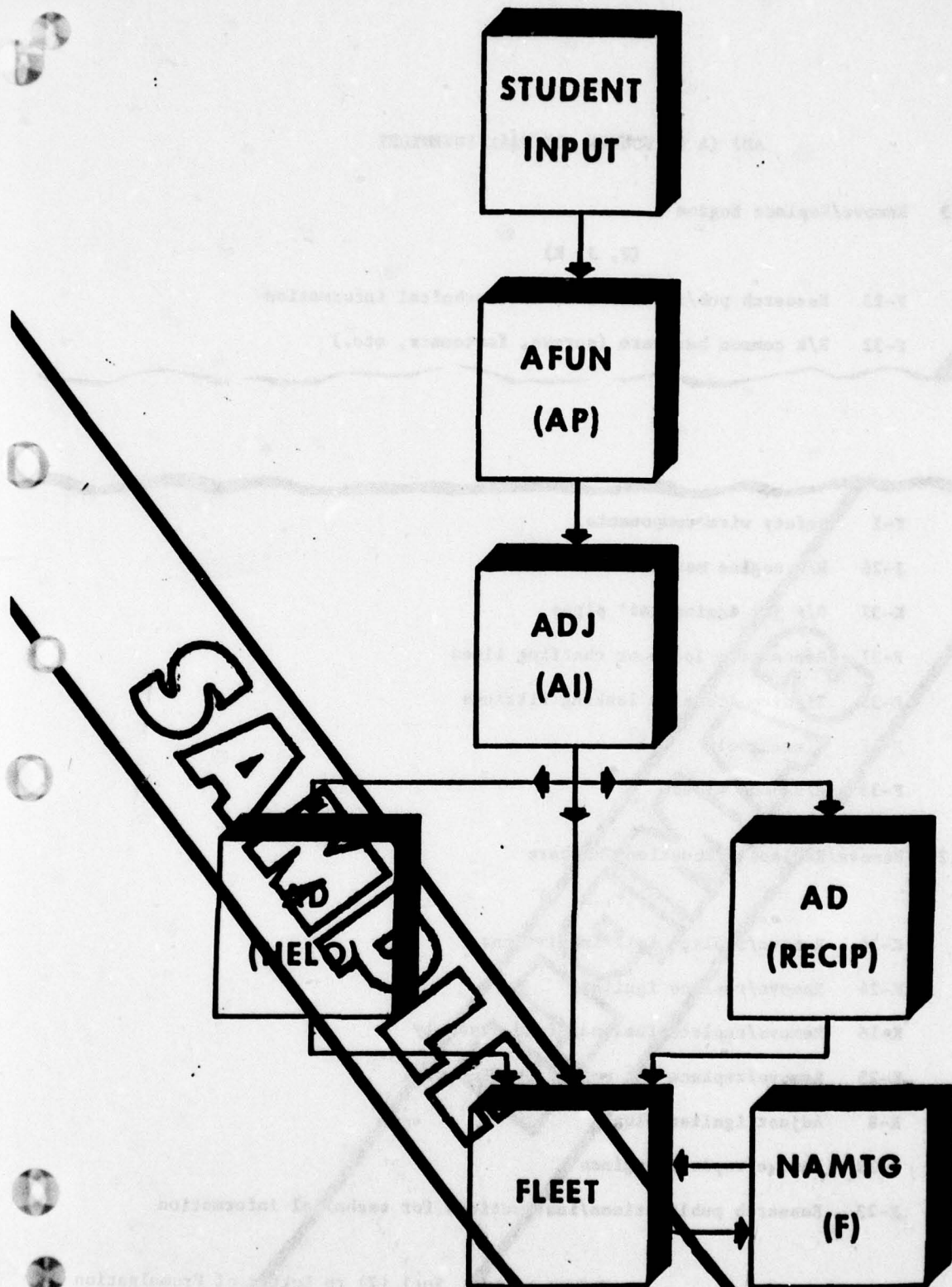


FIGURE 1-13F
71

Enclosure (6)
CHANGE 1

ADJ (A 1) COURSE JOB TASK INVENTORY

J-23 Remove/Replace Engine

(F, J, K)

F-23 Research pub/instructions for technical information

F-32 R/R common hardware (screws, fasteners, etc.)

F-1 Safety wire components

J-26 R/R engine mounts

K-37 R/R jet engine tail pipes

F-37 Reposition loose or chaffing lines

F-35 Tighten loose or leaking fittings

F-37 Clean tools

F-33 R/R bon wires

K-12 Remove/Replace Combustion Chambers

(F, J, K)

K-34 Remove/replace foil insulation

K-24 Remove/replace igniters

K-16 Remove/replace fuel manifold assembly

K-25 Remove/replace jet engine fuel injectors

K-8 Adjust igniter plugs

J-23 Remove/replace engines

F-23 Research publications/instructions for technical information

FIGURE 1-13G Encl (7) to Letter of Promulgation

CHANGE 1

F-32 Remove/replace common hardware

F-31 Remove/replace access panels

F-47 Clean tools

K-39 Remove/Replace Fuel Control

(F, J, K)

J-44 Remove/replace mechanical linkage

J-28 Rig throttle linkage

K-32 Rig linkage from main fuel control to afterburner fuel control

F-47 Clean tools

F-1 Safety with aircraft components

F-32 Remove/replace common hardware

F-31 Remove/replace access panels

J-25 Remove/replace external lines

F-7 Remove/replace "O" rings, gaskets, and hoses

F-37 Reposition chafing of loose lines

F-35 Tighten leading fittings

FIGURE 1-13G

Encl (7) to Letter of Promulgation

CHANGE 1

J-3 Remove/Replace Ignition Harnesses

(F, J, K)

K-8 Adjust igniter plugs

I-58 Remove/replace starting ignition units

F-47 Clean tools

K-22 Remove/Replace Engine Driven Gearbox

(Q, J, F)

Q-5 Remove/replace aircraft generators

J-18 Remove/replace tachometer generator

F-5 Remove/replace low point drain

I-24 Remove/replace engine driven hydraulic pumps

J-2 Remove/replace constant speed drive

F-1 Safety wire aircraft components

F-32 Remove/replace common hardware

F-31 Remove/replace access panels

J-25 Remove/replace external lines

F-7 Remove/replace "O" rings, gaskets, and hoses

F-47 Clean tools

F-37 Reposition chaffing or loose lines

F-35 Tighten leaking fittings

FIGURE 1-13C Encl (7) to Letter of Promulgation
CHANGE 1

J-30 Remove/Replace Coolers

(F, J)

J-61 Flush oil tanks and coolers

F-38 Lubricate aircraft (grease and oil)

J-41 Remove/Replace Throttle Quadrants

(J, F)

J-43 Adjust cable tension

J-44 Remove/replace mechanical linkages

J-28 Rig throttle linkage

F-41 Clean tools

G-14 Turn Up Aircraft

(F, G, J)

F-9 Attach/remove aircraft tie downs

F-10 Attach/remove aircraft protective covers

F-15 Attach/remove aircraft turn up screens

G-15 Stand by aircraft with fire bottle during fueling/starting

J-22 Trouble shoot engine

J-8 Service constant speed drive (CSD)

F-14 Take hydraulic fluid samples

F-13 Take oil samples

F-12 Take fuel samples

FIGURE 1-13G

**Encl (7) to Letter of Promulgation
CHANGE 1**

ADR (A 1 RECIP) COURSE JOB TASK INVENTORY

- F-27 Remove/replace engine cowlings (ball housing, fairing, etc.)
- L-1 Remove/replace engine cooling baffles
- L-7 Remove/replace reciprocating engine cylinders

- L-4 Remove/replace carburetors
- L-11 Adjust carburetors
- L-8 Remove/replace distributors
- L-12 Time reciprocating engines
- L-5 Remove/replace magnetos
- L-1 Perform magneto drop check
- N-13 Remove/replace propeller governors
- N-14 Adjust propeller governors
- N-5 Remove/replace propeller dome
- N-16 Flush/desize propeller dome assembly
- N-15 Remove/replace propeller assembly
- N-3 Remove/replace propeller shafting assembly
- N-4 Remove/replace brush block assembly
- N-2 Dress propeller blades

FIGURE 1-13H Enc. (8) to Letter of Promulgation
PAGE 1

Y-26 Load/download stores on aircraft (drop tanks, blivets, etc.)

F-11 Fuel/defuel aircraft

J-35 Test/inspect check valves

J-21 Remove/Replace Fuel Cells

(F, J)

J-15 Pressure check fuel systems

J-54 Repair fuel leaks (shoot wings, patch cells, etc.)

J-41 Purge fuel cells/tanks

J-11 Drain/flush lines (hydraulic, fuel, etc.)

J-1 R/R transmitters (hydraulic, fuel flow, etc.)

F-23 Research pub for technical information

F-3 R/R common hardware (screws, fasteners, etc.)

F-31 R/R access panels

F-33 R/R bonding wires

J-25 R/R external lines (hydraulic, oil, fuel, pneumatic)

F-35 Tighten leaking fitting

F-47 Clean tools

F-37 Reposition chaffing or loose line (fuel, hydraulic, etc.)

FIGURE 1-13H Encl (8) to Letter of Promulgation

CHANGE 1

S-10/2 Phase/Calendar Inspection

(F, G, J, K, S)

**J-29 Adjust (trim) installed engines to specifications
(manufacturers/NATOPS)**

K-38 Check axial/radial clearance on turbines/compressors

wear, etc.)

G-42 Perform preflight/postflight/turnaround inspections

S-3 Perform aircraft daily inspections

S-4 Perform aircraft special inspections (7-14-28 day, etc.)

**S-5 Perform aircraft conditional inspections (hard landings,
overspeeds, etc.)**

S-6 Perform dye penetrant inspection

F-35 Tighten leaking fittings

F-47 Clean tools

F-33 Remove and replace landing wires

F-1 Safety wire aircraft components

F-30 Remove/replace filters (fuel, oil, etc.)

F-38 Lubricate aircraft (grease, oil)

**F-37 Reposition chaffing or loose lines (fuel, oil, hydraulic,
etc.)**

**FIGURE 1-13H Encl (8) to Letter of Promulgation
CHANGE 1**

F-23 Research Pub/Instructions for Technical Information

(A, C, F, H)

C-1 Order publications

C-11 Order parts/supplies

**H-2 Fill out Visual Information display system (VIDS) cards/
production control reg. cards**

H-11 Fill out maintenance action forms (MAFs)

H-1 Fill out support action forms (SAFs)

H-3 Fill out naval aircraft flight records (yellow sheets)

C-13 Inventory engine accessories

C-12 Inventory engine

W-1 Inspect for Corrosion

(F, K)

F-18 Wash/clean aircraft

**W-6 Apply preservative to aircraft surfaces, components,
cables, etc.**

K-2 Water wash engines using distilled water and solvents

F-38 Lubricate aircraft (except oil)

FIGURE 1-13H Encl (8) to Letter of Promulgation

CHANGE 1

98 (NEOCS) Environmental Pollution Control

98236 Determine effect of incomplete combustion of fuels
on air pollution.

98239 Identify pollution threats due to oil and other
fuel spillage on the water or ground.

98240 Control or minimize the adverse effects of oil and
fuel spillage.

98241 Recognize effects of high noise levels on the human
body.

SAMPLE

FIGURE 1-13H

Encl (8) to Letter of Promulgation

CHANGE 1

AD/BASHEL (A 1) COURSE JOB TASK INVENTORY

- P-18 Remove/replace main rotor blade servo flaps**
- P-11 Remove/replace swivel joints**
- P-3 Remove/replace main rotor stabilizer bars**

- P-7 Remove/replace main rotor transmissions**
- P-10 Remove/replace helicopter drive shaft sections**
- P-2 Remove/replace shaft couplings**
- P-8 Remove/replace drive train gear boxes (tail, intermediate, etc.)**
- P-5 Service helicopter transmissions**
- P-1 Remove/replace tail rotor assembly**
- P-17 Balance tail rotor**
- P-14 Track rotor blades**
- P-1 Fold helicopter blades**
- P-6 Remove/replace right angle drive (power turbine)**

FIGURE 1-131

Encl (9) to Letter of Promulgation

PARAGR 1

SECTION 1 - DEFINITIONS

AUDIT TRAIL - The Audit Trail for a course is a procedural guide (or map) which "shows the way" to design/redesign and develop a Naval Technical Training course to accomplish the stated mission of training students who possess the necessary course entry prerequisites so that as course graduates, they can perform a job in accordance with prescribed job entry standards or assimilate additional training. If a course has been designed/developed in accordance with this guide (Audit Trail), it will be possible to see clearly what has been done and why. If it becomes necessary and sufficient justification exists, such a course can at any time and at any point (or stage) of further development be audited and proposed course changes (revisions) can be incorporated logically and effectively with a minimum of overall course disruption. Use of an Audit Trail is the only reliable way of monitoring a course to maintain job relevancy established through its design/redesign and development procedure.

BILLET - A billet is the basic personnel unit of a Naval organization. It requires the fulltime services of one individual (incumbent). A billet has the following characteristics: (1) it normally utilizes related skills and knowledges; (2) it is officially established with a definite purpose and scope and exists even when vacant.

CLASSES OF COURSES - The following classes of courses have been designated for Naval Training.

Class "R" - Training upon initial enlistment or induction which provides for general indoctrination and prepares the recruit for early adjustment to military life by providing skill and knowledge in basic military subjects.

Class "A" - Provide the basic technical knowledge and skills required to prepare for job entry level performance and further specialized training. Includes apprenticeship training. An NEC may be awarded to identify the skill achieved. Also includes some officer courses such as Communication Officer, ASW Officer, etc.

Class "C" - Provide the advanced knowledge, skills, and techniques to perform a particular job in a billet. An NEC or NOBC may be awarded to identify the skill achieved. Includes schools and courses which used to be identified as Class "B".

Class "F" - Provide team training to fleet personnel, officers and enlisted, who normally are, or are enroute to duty as, members of ships' companies, and refresher training including operators and technical courses of short duration to meet the needs of a fleet or "type commander".

COURSE MISSION - The Course Mission is a statement of who is to be trained, what he is to be trained to do, the degree of qualification brought about by the training, and where and under what general conditions the graduate will perform.

DUTY - A duty is a major sub-division of a job. A duty normally exists in one functional area and is characterized as follows:

- (1) it is a recognized segment of a job that occupies a principal portion of a billet incumbent's work time;
- (2) it occurs frequently in the work cycle;
- (3) it involves work requiring closely related skills and knowledges.

A duty is generally performed according to a prescribed method to meet a set standard. The method and standard employed may be documented or oral, and may have been established by precedent or by higher authority.

FRAMP (TRAINING PROGRAMS) - Planned programs in fleet-readiness squadrons designed to provide Practice Job Training (PJT) for personnel prior to their assignment to an operating squadron where this PJT may be continued as On-The-Job Training (OJT).

JOB - A Job consists of the performance elements that are the responsibility of the one individual assigned to a specific billet.

JOB ENTRY REQUIREMENTS - The skill and knowledge requirements of a job incumbent upon his entry into a specific billet; the requirements represent the end results of the training pipeline for a particular job identified by rate (paygrade) and rating.

JOB ENVIRONMENT - The operational on-the-job environment where the results of training are put into actual practice to accomplish the job tasks of the Navy.

JOB TASK ANALYSIS (JTA) - The process of determining the duties and tasks that are, or should be, performed by personnel occupying a given type of billet or fulfilling a given function.

JOB TASK INVENTORY (JTI) (RATING, TRAINING ENVIRONMENT, COURSE) - The output of the Job Task Analysis which takes the form of a list of Job Task Statements. This document begins as a tentative JTI for a Rating and is subsequently validated and sub-divided into JTI's for Training Environments and finally into JTI's for Courses.

JOB TASK INVENTORY QUESTIONNAIRE - Data-gathering instrument developed by a Task Analysis Team to collect job performance data.

JOB TASK STATEMENT - Items on the Job Task Inventory Questionnaire which describe duties and tasks; used to solicit responses from job incumbents surveyed.

MTA - Modified Task Analysis: Process initiated and developed by Individualized Learning Development Group (ILDG) to obtain job performance data for Task Analysis in some ratings.

NAVAL OCCUPATIONAL FIELDS - Groups of related Navy ratings.

NOTAP - Naval Occupational Task Analysis Program: A program designed to gather, assemble, analyze data; computerize this data and provide appropriate printouts for use by Task Analysis Teams.

RATING SURVEY - A survey conducted to identify, analyze, and validate jobs, duties, and tasks being performed in a rating (occupational field); this survey is conducted at the direction of higher authority and its purpose for training is the use of the data collected in designing/developing job-relevant training.

SYSTEMS APPROACH - The Systems Approach to Naval Technical Training consists of systematic gathering and analyzing data to determine job requirements which will accomplish the Navy's mission; translating job-performance data into a job-oriented training requirements data to provide a training pipeline; developing these training requirements data into Learning Objectives which are grouped and sequenced to be developed into appropriate types of training programs/courses; measuring student achievement of Learning Objectives by Criterion Testing; providing continued evaluation/review/improvement in the training programs.

TASK - A task is a unit of work that forms a significant part of a duty. Tasks which constitute a duty are not necessarily homogeneous.

TASK ANALYSIS - Process of analyzing job performance and designing/developing training to meet job requirements; Task Analysis consists of Job Task Analysis and Training Task Analysis processes.

TASK ANALYSIS TEAM - A team composed of subject-matter specialists in the rating to be analyzed, who have demonstrated their competencies in actual job performance, possess the ability to communicate clearly with others at various levels in their field, and have demonstrated the ability to analyze, design, and develop training materials.

TASK ELEMENT - A task element is a sub-division of a task. It is the smallest unit of work contained in the job that is considered in Job Task Analysis.

TPC - Training Program Coordinator: A member of a functional commander's staff who coordinates the training conducted in an assigned group of schools/courses.

TRAINING ENVIRONMENT - An environment in which training takes place; intended to simulate the actual job environment as nearly as possible.

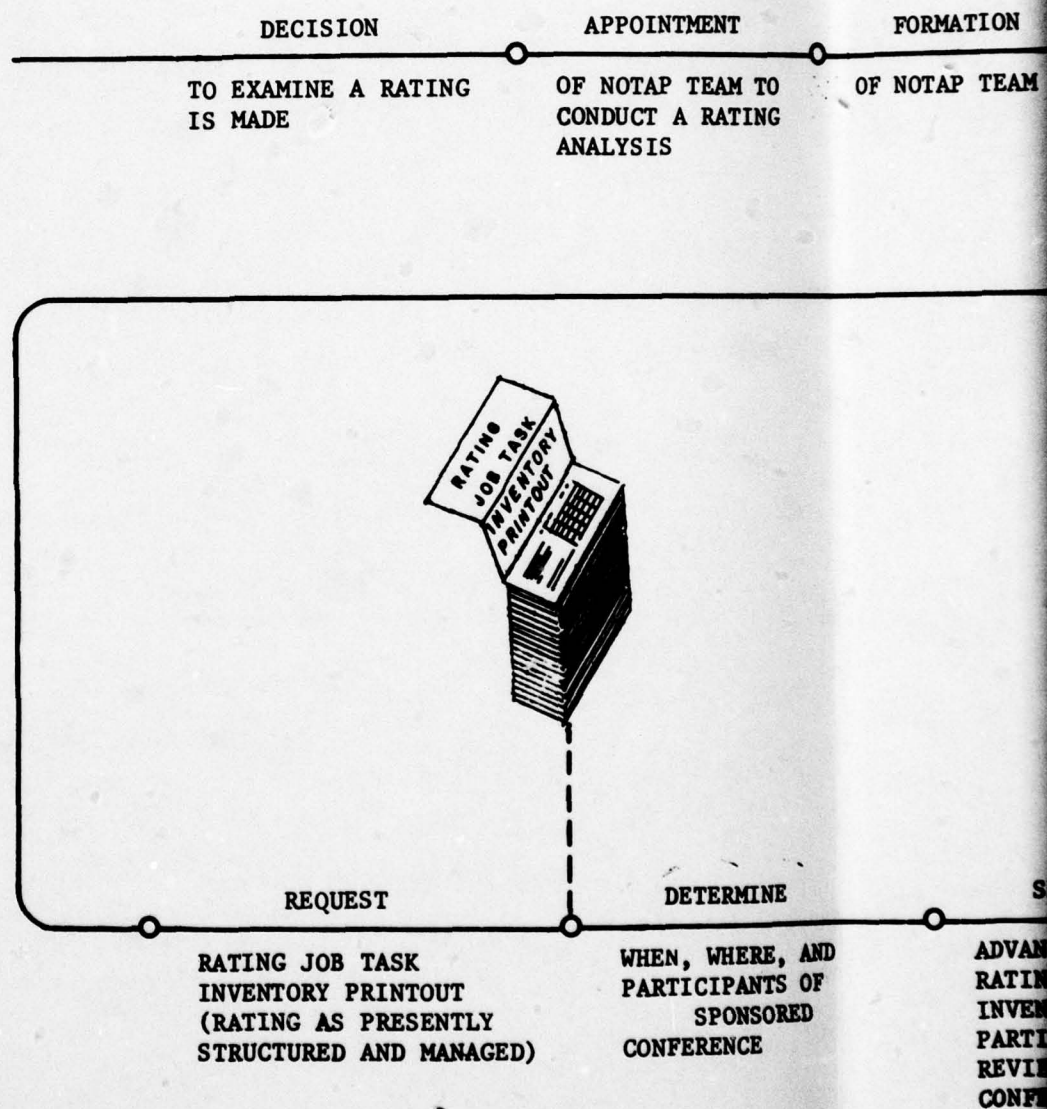
TRAINING PIPELINE - Continuum of training programs (courses) covering training for a rating from recruit training through the actual job situations.

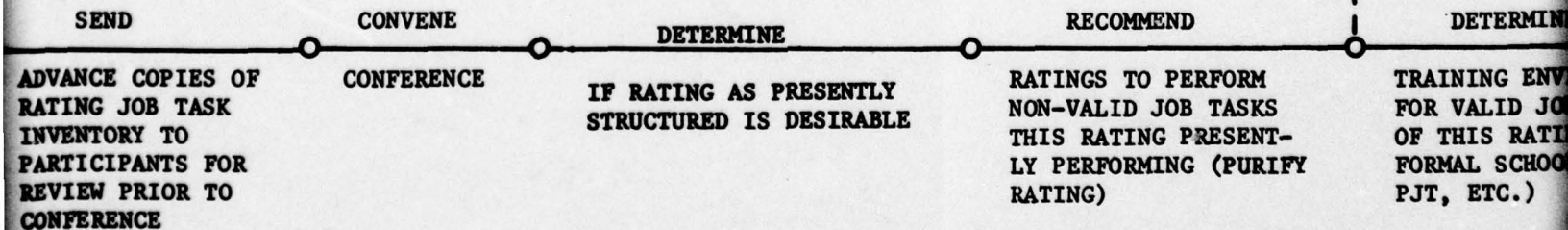
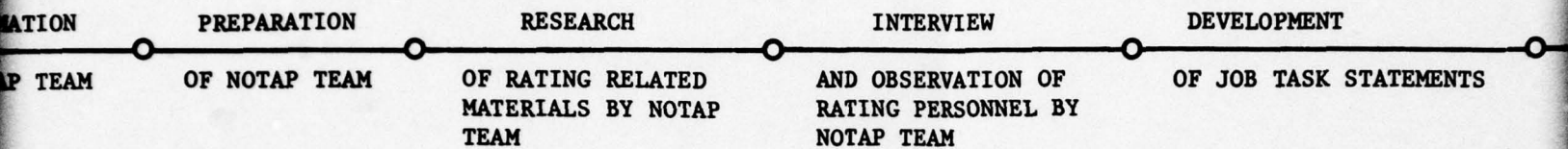
TRAINING TASK ANALYSIS - Analysis of the Job Task Inventory resulting from a Job Task Analysis to develop Training Task Statements as a major part of a Training Task Inventory. These Training Task Statements become the behavior elements of the Learning Objectives and the TTA continues until the completed Learning Objectives are obtained (Behavior, Condition, and Standard elements.)

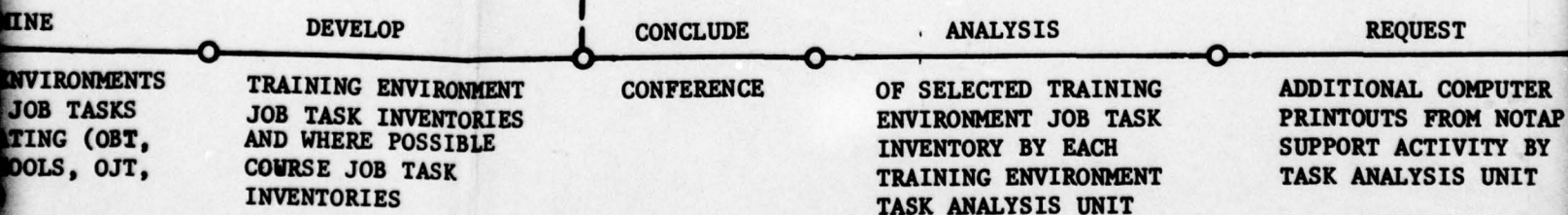
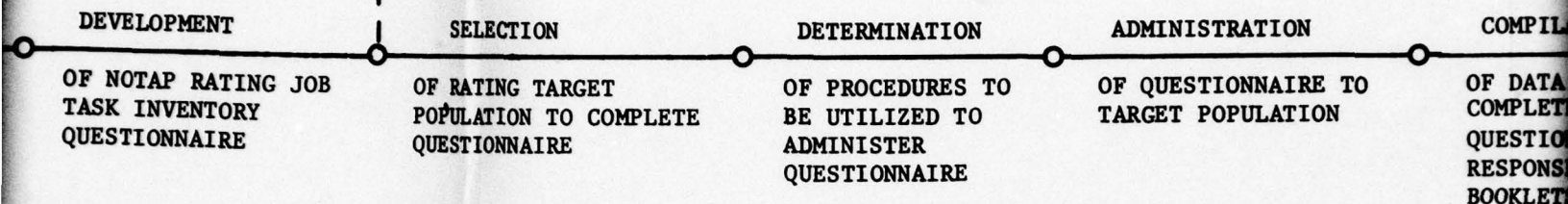
TRAINING TASK STATEMENTS - Statements of training behavior to be performed in the training environment that have been converted from Job Task Statements from the Job Task Inventory.

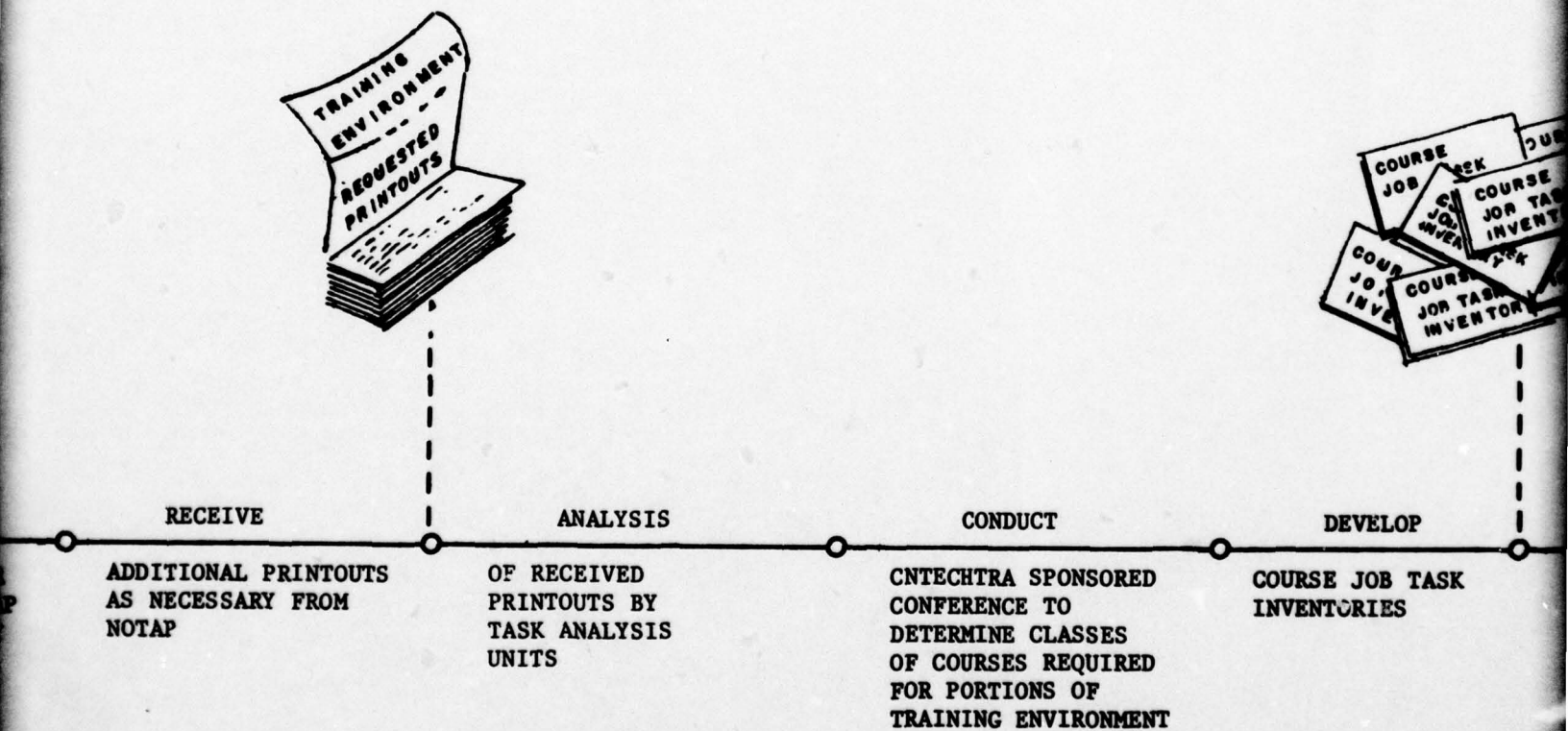
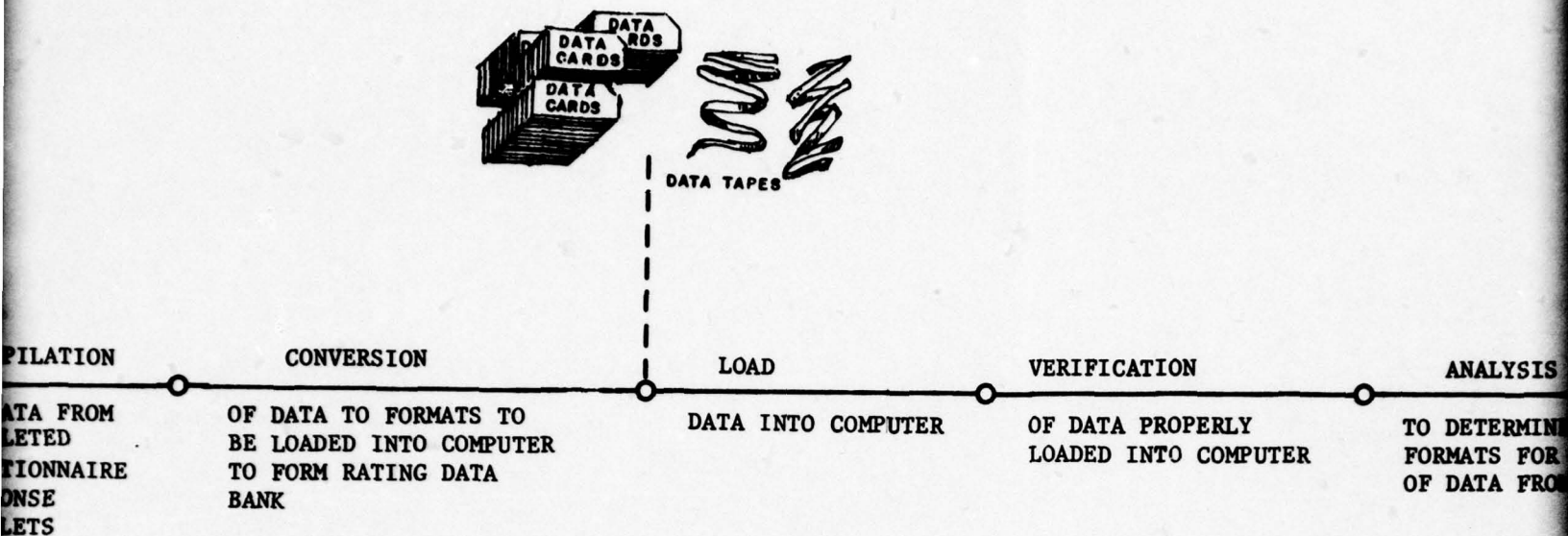
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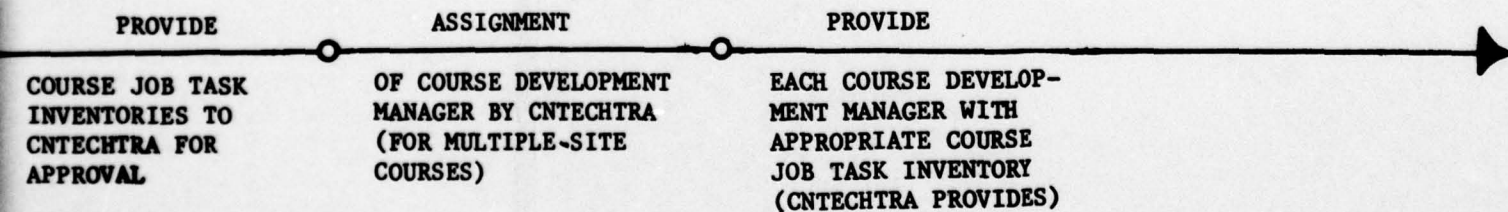
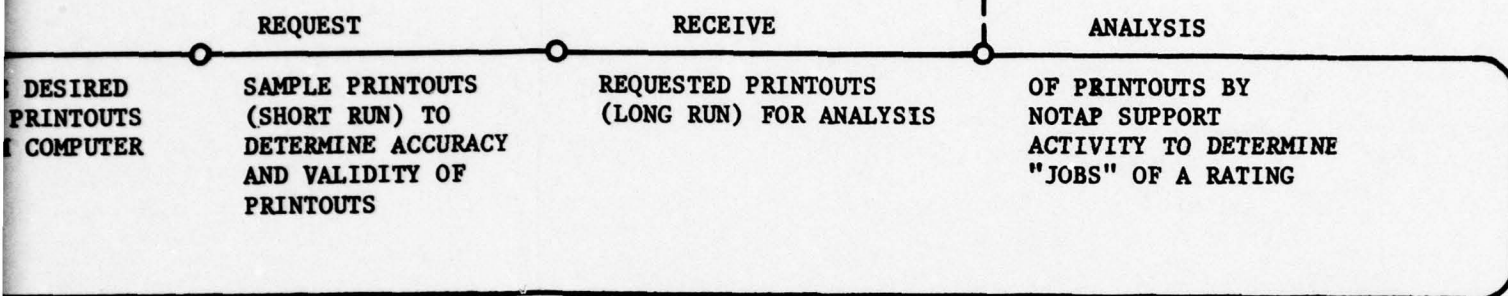
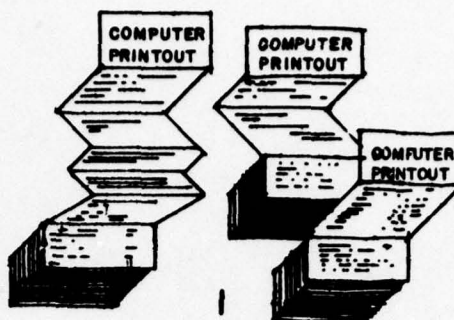
PLANNING











COURSE DESIGN/REDESIGN

Course Design/Redesign is based upon the premise that each task to be performed on a job can be identified and analyzed; relevant Learning Objectives to provide the required skills, knowledge, and attitudes can be prepared; the instructional strategies to achieve these objectives can be structured and conducted; and student achievement can be measured by Criterion Testing.

CONTENTS

SECTION 2 - COURSE DESIGN

CHAPTER 1.0 - The Course Mission

2.0 - Training Task Analysis

3.0 - Learning Objectives

4.0 - Course Outline

5.0 - Course Development Manager Program

Annex 2-1 Definitions

Annex 2-2 Audit Trail - Foldout (Course Design)

1.0 THE COURSE MISSION

Task Analysis Teams have been appraising the effectiveness and validity of training in the various Naval occupational fields. The teams have determined that in many ratings evidence indicates the occurrence of both overtraining and undertraining. Overtraining occurs when the student acquires knowledges or skills that are not utilized in his subsequent job environment. Undertraining exists when unsatisfactory job performance occurs after successful completion of training because the job incumbent has not acquired the job entry level skills and knowledges. The Task Analysis Teams have as a primary goal the restructuring of training so that all training will be job-relevant. These team members have collected, compiled, organized, selected and sequenced the vast amounts of data concerning the tasks that are performed by the Naval occupational fields (ratings). With the assistance of job experts and subject-matter experts they have made determinations of the Training Environments where the training is to be provided for specific inventories of job tasks. These Training Environments may be schools conducting formal training courses, courses onboard, or training in on-the-job environments. Task Analysis team members provide Course Job Task Inventories for each of these Training Environments. These Course Job Task Inventories list the job tasks for which courses (or equivalent training packages) must be designed/redesigned in each Training Environment to provide training for these job tasks.

1.1 COURSE MISSION - GENERAL

Each of the courses in these Training Environments has as its mission, the training of personnel to perform those tasks listed in its Course Job Task Inventory. The Course Mission of a Class "A" course would be to provide training that enables personnel to perform the job tasks listed in the Course Job Task Inventory developed for the Class "A" course Training Environment.

The Course Mission statement provides an overview of the course in terms of the specified elements, and aids in defining course boundaries and scope.

1.2 COURSE MISSION - SPECIFIC

The Course Mission is a statement of who is to be trained, what he is to be trained to do, the degree of qualification brought about by the training, and where and under what general conditions the course graduate will perform. The Course Mission format is a short descriptive paragraph or statement that specifies each of these elements. It is constructed in a manner that presents a smooth flow of ideas.

1.2.1 The Who Element: Specifies the entry level of the personnel for which the course is designed. Examples: 1. Damage Control Team Members, 2. Engineering Ratings E1 - E4, 3, MM3, EN3

1.2.2 The What Element: Specifies what the student will be able to do as a result of the training provided in this course. Examples:

1. Perform all duties of x-type ship damage control officer's billet.
2. Maintain the XYZ radar system.
3. Conduct supply inventories, order materials, ship and receive items.
4. Perform preventive and corrective maintenance on the XYZ equipment.

1.2.3 The Degree of Qualification Element: Specifies the overall qualitative level of performance ability the course graduates will demonstrate upon job entry. Examples:

1. Constant supervision
2. With assistance
3. With X% accuracy
4. At a speed equivalent to x-level trained job incumbent

1.2.4 The Where Element: Specifies where the knowledges and skills acquired during the training provided by the course are designed to be used. Examples:

1. Ships (surface, subsurface, aircraft carriers, destroyers, tenders, CVA, DDG, LHA, DD 963 Class, Trident.)
2. Aircraft (bombers, fighters, cargo, VTOL, B-1, B-58, F-14, F-8D, C-135, etc.)
3. Shore (IMA, stations, installations, bases, facilities, communications stations, air stations, repair facilities, ship yards.)

1.2.5 The Conditions Element: Specifies the general readiness and physical environmental conditions under which the graduate will be able to perform. Examples:

1. Readiness conditions, stress levels I, II, III, IV, etc., full G.Q., peacetime cruising, relaxed G.Q., wartime cruising, etc.
2. Physical environmental, temperature, humidity, visibility, space constraint, radioactivity levels, etc.

Sample Course Missions:

1. The Damage Control Team Training Course is designed to provide damage control team members with the training necessary to control and extinguish Class "A" and "B" fires aboard Navy destroyers in the shortest possible time under emergency conditions, no lighting, no ventilation, excessive temperature.
2. The AN/ABC-4 Navigation Equipment Operator Course is designed to provide QM and SM strikers (designated E-1's through E-3's) with the knowledge and skill training necessary to tactically operate the AN/ABC-4 navigation equipment. Operation will be demonstrated to a level of data retrieval enabling position fixing to ± 200 yards. Equipment will be operated wherever installed under all general conditions.

1.3 FINALIZING THE COURSE MISSION

During the Training Task Analysis process it may become apparent that the design of a course to achieve the Learning Objectives that are determined to be necessary will require some alteration in the final statement of course mission. When this occurs, Course Mission must be modified to fit

in the Training Environment but still be accurate in terms of the specific elements required.

Some considerations to be made when finalizing a Course Mission include: who is available for training; design maintenance philosophy of a system/equipment, if this is the nature of the course; all locations where the course graduates can be used; realistic conditions under which they can perform the job.

The Course Mission is, in effect, the expansion of the course title to provide an accurate course description. Designers, developers, managers, operating forces, etc., will utilize it for a range of purposes from obtaining an overview of the course content, to selecting prospective students, and as a basis for evaluation.

2.0 TRAINING TASK ANALYSIS (TTA)

The Training Task Analysis process is the system for proceeding from the list of job tasks provided in the Course Job Task Inventory, to an organized set of Terminal and Enabling Objectives that describe the training to be provided in a course.

2.1 THE TTA PROCESS

Major Steps:

1. Identification of job environment conditions, standards and equipment requirements for each job task
2. Development of Training Task Statements
3. Determining Skill and Knowledge Requirements
4. Assessment of Target Population Entry Level
5. Determination of conditions for Training Task Statements
6. Determination of standards for Training Task Statements
7. Determination of equipment requirements for Training Task

Preparation:

Transfer to individual Job Task Cards, (Figure 2-4), each Job Task Statement listed on the Course Job Task Inventory. One Job Task Statement is listed on each card, this will facilitate the procedures that follow. Based on logic, common sense, or arbitrary choice, divide the Job Task Cards into two stacks. The first stack will contain major job tasks, and the second stack will contain minor job tasks.

JOB TASK CARD

Job Task # _____ (from inventory)

Job Task Statement _____

Related/Supporting Job Tasks #'s _____

Job Conditions Under Which This Job Task is Performed

Job Standards of Performance Required for This Job Task

Equipment Required for Performance of This Job Task

REMARKS: (Items not well defined or requiring resolution
or other pertinent remarks relevant to training for
this Job Task).

FIGURE 2-4 JOB TASK CARD FORMAT

2.2 IDENTIFYING JOB ENVIRONMENT CONDITIONS, STANDARDS AND EQUIPMENT REQUIREMENTS

Specific information concerning the performance of each of the job tasks should be obtained by observing the performance of the job in the job environment. Data concerning job conditions, standards, and equipment requirements will have been recorded by the Task Analysis Team at the job locations whenever feasible. In some instances it may become necessary to obtain the required information by less direct methods. Analysis of films of job performance, communication in all forms with personnel in the job environments, analysis of documentation related to the job, etc. are some of these less direct methods. Once the information has been obtained, it is recorded on the appropriate Job Task Cards.

In the ratings where NOTAP has conducted a Job Task Analysis much of this data can be obtained from computer printouts supplied by the NOTAP support activity. Special printouts can be requested and analyzed to complete the Job Task Cards. In the ratings where NOTAP has not conducted a Job Task Analysis the Task Analysis Team that performed a modified task analysis or rating task survey to derive the Course Job Task Inventory can provide the information required for the Job Task Cards.

2.3 DEVELOPMENT OF TRAINING TASK STATEMENTS

The Development of Training Task Statements for the Training Task Cards, (Figure 2-20), is accomplished by an analyzing and a grouping process. The Training Task Statements will eventually be developed into Learning Objectives for which the course will be developed. Since the student achievement of Learning Objectives is measured in terms of observable behaviors, the Training Task Statements must be written using action verbs that represent measurable behavior. A Glossary of Action Verbs follows.

GLOSSARY OF ACTION VERBS

ACCEPT - Receive with consent; e.g., accept international mail for transmission.

ACCOUNT FOR - Furnish a justifying analysis or explanation; e.g., account for common aviation handtools.

ACKNOWLEDGE - Report receipt of (a letter, check, supplies, etc.); e.g., acknowledge receipt of aviation material.

ACTIVATE - Make active; e.g., activate storage batteries.

ADJUST - Fit to meet regulations or requirements.

ADMINISTER - Manage or direct execution, conduct, or application of.

ADVISE - Recommend course of action (particularly applicable to staff and technical fields).

ALIGN - Adjust, form, or bring to, a line.

ALTER - LOGISTICS FIELD: Resew garments for better fit; SHIP MAINTENANCE SUPPORT FIELD: Reshape metal.

ANALYZE - Study parts, elements, or factors of a situation or problem in detail to determine course of action, solution, or outcome; e.g., analyze malfunction of servo and computing circuits.

ANNEAL - Subject to high heat, with subsequent controlled cooling, for the purpose of softening thoroughly and rendering less brittle; e.g., anneal gravers, springs and screwdriver bits.

ANNOTATE - Furnish with critical or explanatory notes; e.g., annotate a text.

ANSWER - Act or reply in response to an action performed elsewhere or by another; e.g., answer verbal inquiries concerning routine mail service.

APPLY - Put to use; e.g., apply flux to a joint to be soldered.

APPROVE - Give official sanction to; e.g., approve proposed plans and procedures.

ARRANGE - Put in order; adapt; e.g., (a musical composition) by scoring for voices or instruments other than those for which originally written; e.g., arrange courtroom for trial.

ASSEMBLE - Put together into a unit from parts or subassemblies; e.g., assemble usage and inventory data.

ASSIGN - Specify, select, or designate; e.g., assign responsibilities to CIC personnel.

ASSIST - Aid, help, support - as regular part of duties, as requested, required or initiated; e.g., assist dental officer while treating patients.

ATTACH - Connect; fasten.

AUDIT - Examine with intent to verify.

AUTHENTICATE - Prove authentic, confirm, verify as to genuineness; e.g., authenticate on a fleet CW circuit.

BLEED - Drain or empty of liquid, gas, or other contents; e.g., bleed a steam cylinder.

BORESIGHT - Sight along a bore in order to determine lineal integrity; e.g., boresight aircraft guns.

BRAZE - Solder with a relatively infusible alloy.

BREAK OUT - Take down from or out of a customary place of storage for an operational or maintenance purpose; e.g., break out a sound-powered phone headset.

BRIEF - Present the pertinent facts; e.g., brief pilots before a mission.

BUILD UP - Replace worn material in order to return (an article) to original dimension or thickness.

CALIBRATE - Ascertain the caliber of, determine, rectify, or mark the gradations of; adjust in accordance with a previously defined standard; e.g., calibrate passive and active sonar equipment.

CANCEL - Mark for deletion.

CARRY OUT - Take action on basis of orders, regulations, directives, established policies, approved plans, etc.

CARVE - Cut and serve meat; wood carving, etc.

CASH - Pay or obtain cash for.

CHANGE - Replace with another; e.g., change typewriter ribbons.

CHARGE - Lay or put a load on or in; e.g., charge a torpedo air flask or battery.

CHECK - Inspect for satisfactory condition, accuracy, safety, or performance; e.g., check overhaul schedules for conformity with maintenance program.

CLASSIFY - Place in categories, as personnel, duty positions, supplies, etc.; e.g., classify intercepted electromagnetic radiations, such as radar, navigational, jamming, or missile control signals.

CLEAN - Rid of dirt, impurities, or extraneous matter.

COLLECT - Gather together, assemble, accumulate, compile; e.g., collect data on structure and functionings of naval organizations.

COLLIMATE - Make parallel (as rays of light); adjust the line of sight of (a level or transit); e.g., collimate basic optical instruments.

COMMUNICATE - Give, or give and receive, information, signals, or messages in any way, as by speech, gestures, writing, etc.

COMPACT - Pack together by vibration or rodding.

COMPARE - Examine for likenesses and/or differences; e.g., compare performance with established standards.

COMPILE - Collect into proper or designated form; e.g., compile data into a report.

COMPLETE - Provide with lacking parts or information; e.g., complete casualty analysis inspection sheets.

COMPLY - Conform to guidelines previously established.

COMPOSE - Put together or create, as a letter or a musical work.

COMPUTE - Determine by mathematical processes; e.g., compute leave balances and leave credits.

CONDUCT - Lead; direct; e.g., conduct a musical overture.

CONSTRUCT - Put together systematically; e.g., construct tests for measuring achievement.

CONTROL - Keep within limits; e.g., control site deployment of materials and equipment.

COORDINATE - Bring into common action with others, generally with equal ranks rather than subordinates, as in coordinating attacks with adjacent units or supporting units or as in coordinating staff functions to obtain a result that requires action on the part of several staff sections.

COPY - MUSIC FIELD: Notate in accordance with standard music editorial practices; duplicate by whatever means.

CORRECT - Make or set right; alter or adjust to bring to a required condition; rectify; indicate and eliminate errors, faults, discrepancies to be amended.

CROP - Remove the upper or outer parts of; e.g., crop pictures for newspaper reproduction.

CURE - Treat to prevent sudden loss of moisture from concrete by using water, wet sand, or straw; medical application; food aging process.

CUT - Make or fashion by cutting; e.g., cut with a gas cutting torch or shears.

DECODE - Convert from code into ordinary language.

DECONTAMINATE - Rid of contamination.

DEENERGIZE - Remove energy from.

DEFINE - Determine and express the essential qualities or precise meaning of.

DEHYDRATE - Remove water from; e.g., dehydrate a refrigeration system.

DESIGN - Plan or sketch a pattern or outline for; e.g., design cards and report forms.

DETAIL - Furnish with the smaller elements of design or finish; e.g., detail a drawing.

DETECT - Discover the presence or existence of something previously hidden or unclear; e.g., detect chemical warfare agents.

DETERMINE - Obtain definite and first hand knowledge of; e.g., determine one's position at sea by plotting a cross bearing on two or more references.

DEVELOP - Unfold more completely, evolve the possibilities of (something latent), advance, further, promote the growth of; unfold gradually, form or expand by a process of growth; make more available or usable.

DIAGNOSE - Recognize, analyze and identify (usually a disease, but in military parlance any condition, state or situation) by examination and observation; e.g., diagnose irregular flight characteristics of aircraft.

DIFFERENTIATE - Perceive or express the difference; distinguish between.

DIRECT - Regulate the activities or course of; control; guide; give an order or instruction to; e.g., direct men in deck watch section.

DISASSEMBLE - Break down, take apart; e.g., disassemble an electrical generator, or a differential pressure gauge.

DISSEMINATE - Diffuse, distribute, spread by dispersion, circulate; e.g., disseminate intelligence of current value in naval operations.

DISTINGUISH - Recognize or discriminate one thing from another; perceive clearly; e.g., distinguish between radar blips.

DISTRIBUTE - Divide, deal out, portion; e.g., distribute incoming mail to ship divisions.

DRAFT - Make a preliminary sketch or composition of; e.g., draft a naval message.

DRAIN - Draw off (liquid) gradually or completely.

DRAW - Create a likeness or picture in outlines; sketch.

DRESS - Display from flagstaff and from each masthead largest national ensign furnished to ship. CONSTRUCTION FIELD: Prepare by special process, as rough lumber.

DRY - Free of water or liquid.

DRILL - Train or conduct exercises in military evolutions and the use of weapons.

DUST - Sprinkle with fine particles.

EDIT - Revise and make ready for publication; assemble (as a motion picture) by cutting and rearranging.

EFFECT - Bring to pass; accomplish by performance; make possible by execution; e.g., effect authorized field modifications of equipment.

ENCODE - Convert from ordinary language into code; e.g., encode a naval or international signal.

ENERGIZE - Give energy to, activate; switch on; e.g., energize a submarine fathometer.

ENFORCE - Compel observation of or compliance with, such as a regulation, rule, policy, procedures; e.g., enforce safety regulations and procedures.

ENSURE - Make certain and inevitable; make sure of; e.g., ensure maximum care of patients.

EQUIP - Furnish for service; fit out; supply with what is necessary for efficient action; provide with arms, stores, munitions, rigging, etc.; e.g., equip boats for abandonment of ship.

ERECT - Build; set up; establish.

ESTABLISH - Institute; bring into existence.

ESTIMATE - Form a judgment about; gauge; determine or calculate approximately; e.g., estimate the need for supplies and equipment.

EVACUATE - Remove something from, esp. by pumping; e.g., evacuate a refrigerant.

EVALUATE - Determine value or worth of, appraise; e.g., evaluate inspection forms, work orders, and discrepancy reports.

EXAMINE - Scrutinize to determine nature, condition, or quality of.

EXERCISE - Put into action, use, employ; practice, activate for the purpose of training or developing; exert, wield, or have (influence, control, authority); e.g., exercises control over departmental publications.

EXPRESS - Put into words, represent by language, state; make known, show; picture, represent, symbolize; signify; e.g., express the Navy policy in regard to matters of public interest.

FABRICATE - Construct by assembling standard parts or sections; e.g., fabricate elementary designs.

FILE - Lay away documents, papers, etc., in a methodical manner; set in order.

FIT - Adjust to a required form and size; e.g., fit doors and windows.

FLUSH - Pour liquid over or through, esp. to wash out with a rush of liquid.

FORECAST - Predict; indicate as likely to occur.

FORM - Construct; frame.

FORMULATE - Express or put in systematized statement; e.g., formulate plans, policies, procedures, etc.

FORWARD - Transmit; send onward, as a report, through channels.

GLAZE - Furnish or fit with glass; e.g., glaze a window.

GUARD - Watch over so as to prevent escape, disclosure, or indiscretion.

HANDLE - Manage, control, direct, deal with, perform a function with regard to, treat, manipulate; e.g., handle manila or wire rope.

HARDEN - Indurate; make hard; e.g., harden gravers, springs, and screwdriver bits.

HARMONIZE - MUSIC FIELD: Create vertical combinations of different pitches and correct them according to the rules of harmonic progression.

IDENTIFY - Establish the identity of; distinguish; discriminate; in nautical parlance, recognize or name; e.g., identify flags and ensigns of major maritime powers.

IMPLEMENT - Accomplish, fulfill, carry out, put into effect; e.g., implement plans and policies.

INDOCTRINATE - Instruct in rudiments or principles of.

INFORM - Give knowledge to; tell; acquaint with a fact; notify.

INITIATE - Bring into practice or use; e.g., initiate routine correspondence.

INSERT - Put or thrust in; e.g., insert a bathythermograph card.

INSPECT - Look at carefully; examine critically; examine or review officially; e.g., inspect commutator segments and brushes for alinement.

INSTALL - Set up or fix for use or service; establish in a place; e.g., install a boat compass.

INSTRUCT - Impart knowledge systematically; inform; furnish with directions; direct or command; train or indoctrinate; e.g., instruct personnel in identification of ships and aircraft.

INTERPRET - Explain or tell the meaning of.

INTERVIEW - Consult formally with (usually implies questioning or obtaining information); e.g., interview witness.

INVENTORY - Prepare an itemized account of goods or stock, usually at regular intervals and sometimes including the worth of the items listed; e.g., inventory allowed materials.

INVESTIGATE - Observe or study by close examination and systematic inquiry; e.g., investigate all routine repairs aboard ships alongside.

ISOLATE - Select from among others.

ISSUE - Give out officially, as orders and directives, supplies, and equipment.

JOIN - Connect; link together.

LAUNDER - Wash, or wash and iron, clothing or linens.

LOAD - Lay a load or burden on or in; place a load or charge in (a firearm, rocket launcher, etc.); e.g., load guns.

LOCALIZE - Determine the origin or place of, as an organic or mechanical malfunction.

LOCATE - Designate the site or place of, define the limits of; e.g., locate damage control fittings.

LOG - Enter into a ship's log, make a daily record of speed, direction, and distance traversed; enter into any naval record; e.g., log routine correspondence.

LUBRICATE - Make smooth or slippery.

MAINTAIN - Hold or keep in a state or condition, especially in a state of efficiency, newness, validity, or cleanliness; e.g., maintain a surface plot.

MANAGE - Have direct charge of, as a facility, program, project, or office.

MANEUVER - Cause to execute tactical movements.

MANUFACTURE - Make by hand, machinery, or other agency; work into suitable form for use; fabricate; e.g., manufacture reinforced concrete block.

MARK - Affix a significant identification to; indicate by marks or symbols.

MATE - Join together.

MEASURE - Ascertain the extent, degree, quantity, dimensions or capacity of, by a standard; e.g., measure radar ringtime.

MEET - Become acquainted with.

MEND - LOGISTICS FIELD: Repair clothing by sewing.

MIX - Combine or blend into one mass; e.g., mix paint or concrete.

MONITOR - Observe, listen to, check on (as equipment, person, or function) for compliance with instructions or regulations, or for effectiveness; e.g., monitor organizational level maintenance.

NOTATE - MUSIC FIELD: Represent sound by written or printed characters.

OBSERVE - Pay special attention to.

OBTAIN - Procure, get possession of; e.g., obtain data for inclusion in a rough deck log.

OPERATE - Cause to function.

ORDER - Place an order; e.g., order fireroom supplies.

ORGANIZE - Arrange; systematize persons or things into proper places, especially in relation to each other.

OVERHAUL - Examine thoroughly, checking for needed repairs and making repairs and adjustments needed to restore working order; e.g., overhaul generating and control equipment.

PACKAGE - Wrap or box as for selling, carrying, disposing, or storage; e.g., package items for shipping.

PASS - Transmit from one person or group to another.

PATCH - Mend, repair, strengthen, etc., with a patch or overlay; e.g., patch lacerations, abrasions and punctures of liferafts.

PERFORM - Carry out or execute some action.

PIN - Fasten or secure with a pin.

PIPE - Call or direct by the boatswain's whistle; e.g., pipe all shipboard calls.

PLACE - Position; set in a particular place; e.g., place concrete.

PLAN - Think out beforehand; e.g., plan day-to-day job assignments; plan a course of action.

PLOT - Mark the position of something on a map or plan; e.g., plot ranges, bearings and fixes on nautical charts.

PLUG - MARINE ENGINEERING FIELD: Secure by inserting a plug.

POSITION - Put in proper place.

POST - Transfer or carry from one record to another.

PREPARE - Make ready; put into a state for use or application; e.g., prepare a request for survey.

PRESENT - Offer for consideration or view; e.g., present findings of an investigation; present Navy policy to the press.

PRESERVE - Keep from harm, damage, danger, evil, etc.

PRESS - Smooth clothing with a heated flatiron.

PRINT - Letter; write in letters shaped like those of ordinary roman text type.

PROCESS - Subject to a special treatment; e.g., process photographic film.

PROOFREAD - Read and mark corrections in (a proof).

PROVIDE - Supply for use; furnish; e.g., provide speed and latitude data to gyro electrician for gyrocompass correction.

PURGE - Cleanse or rid of impurities, foreign matter, or undesirable elements; e.g., purge air from air conditioning systems.

REACTIVATE - Make active again.

READ - Interpret the meaning of.

REAM - Enlarge or remove burrs from a pipe; e.g., ream a pipe fitting.

REASSEMBLE - Refit together the parts of.

RECEIVE - Accept delivery of something; e.g., receive surplus material for disposal.

RECOGNIZE - Identify by some detail; e.g., recognize friendly and enemy ships and planes.

RECOMMEND - Offer or suggest course of action; e.g., recommend a survey of general and technical stores items.

RECONCILE - LOGISTICS FIELD: Resolve differences in records and reports.

RECORD - Write, enter, or register for purpose of evidence or reproduction, e.g., record data in a chronometer record book.

REEVE - Fasten by passing through a hole and/or around something; e.g., reeve a single whip, runner, luff tackle or twofold purchase.

REFACE - MARINE ENGINEERING FIELD: Line near the edge, esp. with a different material.

REFINISH - Give a new surface to.

REGULATE - Control or govern according to a rule, principles, or system; adjust for accurate operation, as gauges or scales; e.g., regulate water level in a steaming boiler.

REHEARSE - MUSIC FIELD: Train or make proficient by practice prior to a public performance.

REMOVE - Change the location of by taking off, out of, or away from, lifting, pushing aside; e.g., remove a bathythermograph card.

RENDER - Give, deliver, or transmit; e.g., render passing honors to naval ships, gigs, and barges.

REPAIR - Restore to working condition, as equipment, at field or higher echelon maintenance; e.g., repair radio headsets and microphones.

REPLACE - Supply an equivalent for; e.g., replace hydrophones and transducers.

REPLENISH - Fill up again; replace.

REPORT - Give an account of orally or in writing.

REQUISITION - Make a formal request, application or written order, as for equipment, tools, paper, food, supplies; e.g., requisition allowed materials.

RESCUE - Free from any confinement, violence, danger or evil; e.g., rescue a person in contact with an energized circuit.

RESOLVE - Analyze and decide or settle something (implies position and authority for making a decision).

RESUME - Begin again after interruption.

REVIEW - Examine critically or deliberately; e.g., review transactions involving expenditure of funds.

REVISE - Look at or over again and correct or improve.

REWRITE - Put into form for publication.

RIG - Furnish or provide with equipment; e.g., rig with wire rope.

ROTATE - LOGISTICS FIELD: Change position of; turn about a center.

ROUTE - Fix the order of procedure in a series of operations; e.g., route classified matter.

SANITIZE - Make sanitary (as by cleaning or sterilizing).

SCALE - Make or pattern in regularly graded proportions.

SCHEDULE - Designate fixed times for accomplishment of, as training programs, mail deliveries, courier service, etc.

SCORE - Determine the merit of; grade.

SCREEN - Examine, usually methodically, in order to separate into different groups.

SEARCH - Look for, hunt through, examine, explore, inquire, scrutinize.

SECURE - Make safe, firm, fast, or tight.

SEIZE - Take possession of by legal process.

SELECT - Take by preference from among others; e.g., select portable power tools for maintenance of sonar equipment.

SELL - Give up something for money or other valuable consideration.

SEND - Dispatch by some means of communication.

SERVE - Perform the duties of a specific assignment; e.g., serve as a crew member.

SERVICE - AVIATION GROUND OPERATIONS/SUPPORT FIELD: Provide minor maintenance such as supply aircraft with gas, oil, and air.

SEW - Unite or fasten by stitches made with a flexible thread or filament.

SHARPEN - Make sharp.

SHAVE - Sever the hair from close to the skin with a razor.

SING - MUSIC FIELD: Produce musical tones by means of the voice.

SOLDER - Join with solder; e.g., solder pipe fittings.

SOLVE - Determine answers to problems; e.g., solve mathematical problems.

SORT - Arrange according to characteristics.

SPEAK - Articulate sounds with the ordinary voice; talk; enunciate.

SPELL - Name, write, or print the letters of - in order.

SPLICE - Join or unite (ropes and wires) by weaving together the end strands; e.g., splice halyards.

STAND - Perform the duty of; e.g., stand the fire watch.

START - Begin; cause to move or operate; e.g., start ECM equipment.

STEER - Set and hold a course; guide by mechanical means; e.g., steer ship in restricted waters.

STERILIZE - Free from living germs; e.g., sterilize dental instruments.

STOP - Cause to cease; arrest the progress or motion of; e.g., stop IFF equipment.

STORE - Deposit in a place (as a warehouse) for preservation and/or security.

STOW - Place or arrange in a compact mass; e.g., stow charts and other navigational aids.

STRAIGHTEN - Make straight in direction, form, position.

STRIP - Remove extraneous or superficial matter from.

SUBMIT - Present or refer to others for decision or consideration; e.g., submit reports, proposals, estimates, etc.

SUPERVISE - Give direct orders and instructions followed up by personal observation of activities for subordinates.

TAG - Supply with identifying marker; e.g., tag valves.

TEMPER - Bring (steel, glass, or the like) to a degree of hardness and toughness; e.g., temper gravers and springs.

TEST - Examine critically or try out material.

TESTIFY - Make a solemn declaration under oath for purpose of establishing a fact.

TIE - Attach; make a bond or connection; fasten; e.g., tie a bowline on a bight.

TRACE - Follow the path, development, process or history of.

TRACK - Follow the course of; trace by means of such evidence as radar blips and sonar echoes.

TRAIN - Form or impart proficiency by teaching drilling, instructing, discipline, etc.

TRANSCRIBE - Translate data or information from one recording form to another.

TRANSFER - Convey from one place, person or thing to another.

TRANSPORT - Carry from one place to another, especially over relatively long distances; e.g., transport an injured person by fireman's lift.

TREAT - Act upon with some agent, esp. to improve or alter; e.g., treat a metal with acid.

TROUBLESHOOT - Correct, remove, or mitigate or trouble or deleterious condition; e.g., troubleshoot electrical and mechanical control systems.

TRUE - Fit, place, shape, or adjust accurately; e.g., true pressure gage hairsprings.

TUNE - Adjust or adapt to a condition, state, etc.

TYPE - Produce visual information by means of a typewriter.

UNLOAD - Take the cargo from.

UNMATE - Separate; unmatched; e.g., unmate missiles.

UNPACKAGE - Remove covering from.

USE - Employ; carry out purpose or action by means of; expend or consume by putting to use; e.g., use electrical and electronic schematics.

VERIFY - Confirm condition, correctness, status, or level.

WELD - Unite or fuse pieces of metal by hammering, compression, or the like, esp. after rendering soft or pasty by heat, sometimes with the addition of a fusible metal.

WIND - Tighten the spring of; e.g., wind chronometers.

WIRE - Use wire on; e.g., wire shut a valve.

WRITE - Compose; e.g., write captions for pictures.

ZERO - Determine or adjust the zero of; e.g., zero synchros.

2.3.1 IDENTIFYING TERMINAL BEHAVIORS

2.3.1.1 Scan the stack of major Job Task Cards. Determine and assign broadly descriptive job-behavior-oriented titles to represent groups to which job tasks possessing a nature of similarity may be assigned.

2.3.1.2 Sort the major job tasks into the titled groups.

2.3.1.3 As the sorting/arranging of major job tasks into titled groups progresses, it may become evident that titled groups in addition to those already identified are necessary. When this occurs, assign additional titles and start sorting job tasks into the new titled groups as appropriate.

2.3.1.4 After all major job tasks have been sorted into titled groups, recheck to ensure that each job task is assigned to the proper titled group. This rechecking procedure is essential since during the sorting process new titled groups may have been identified and job tasks that had already been assigned to one titled group may upon re-examination be more appropriately assigned to a new titled group. Continue the rechecking procedure until all titled groups have been identified and all major job tasks are assigned to the proper group.

2.3.1.5 Determine the broad terminal job behavior that identifies each titled group.

2.3.1.6 On a Training Task Card, write a descriptive training-behavior-oriented statement for each group that expresses in definite terms the broad terminal job behavior described by the total of the job tasks within the group. These Training Task Statements will become the behavior elements of the Terminal Objectives for the course being designed.

(Conditions and standards will be determined and added later).

The terminal behavior statements of the Terminal Objectives for the course are listed on the Training Task Cards. Each Training Task Card will have associated with it a group of related Job Task Cards. On each Training Task Card, list the numbers of the job tasks from the Course Job Task Inventory that make up that group.

2.3.2 IDENTIFYING MAJOR ENABLING BEHAVIORS FOR EACH TERMINAL BEHAVIOR

2.3.2.1 Select one (1) terminal training behavior statement and its corresponding group of Job Task Cards.

TRAINING TASK CARD	SEQUENCE # _____																								
Level: <input type="checkbox"/> Terminal <input type="checkbox"/> Major Enabling <input type="checkbox"/> Minor Enabling																									
<input type="checkbox"/> S&K Required																									
CHECK ONE																									
Behavior Statement _____ _____ _____																									
Developed/Derived from Job Tasks #'s _____ _____																									
Training Conditions that will be provided for this training task _____ _____ _____																									
Training Standards to be achieved in the Performance of This Training Task _____ _____ _____																									
Equipment Required for Performance of this Training Task, Based on the above Information <table style="width: 100%; border-collapse: collapse;"> <tr><td style="border-bottom: 1px solid black; width: 33%;"></td><td style="border-bottom: 1px solid black; width: 33%;"></td><td style="border-bottom: 1px solid black; width: 33%;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> <tr><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td><td style="border-bottom: 1px solid black;"></td></tr> </table>																									
REMARKS: S&K Required																									

FIGURE 2-20 TRAINING TASK CARD FORMAT

2.3.2.2 Arrange the Job Task Cards of the selected group into subgroups of job tasks that can be trained together.

2.3.2.3 Assign descriptive training task titles to each sub-group of tasks that can be trained together. As the assignment of job tasks to training sub-groups that can be trained together progresses, it may become evident that a job task can be trained equally well in more than one training sub-group. When this occurs, make a duplicate Job Task Card and place one with each sub-group.

2.3.2.4 After all of the job tasks in the selected group have been assigned to the appropriately titled training sub-groups, recheck to ensure that the assignments are correct.

2.3.2.5 Determine the specific training behavior identified by the job tasks assigned to each titled training sub-group.

2.3.2.6 On a Training Task Card, write a descriptive training-performance-oriented statement for each titled training sub-group that expresses in specific terms the training behavior required by the job tasks within the sub-group. These statements are the training behavior elements for the Major Enabling Objectives that support the one terminal training behavior selected. (Conditions and standards will be determined and added later.) On the Training Task Card for each training sub-group list the numbers of the job tasks that make up the associated sub-group.

2.3.2.7 Select a second terminal training behavior statement and its corresponding group of Job Task Cards, and perform the process described previously.

2.3.2.8 Select a third terminal training behavior statement and continue this process until all terminal training behavior statements and their corresponding groups of job tasks have been resolved into statements of training behavior elements for the Major Enabling Objectives. When this process is completed, the training behavior elements for the Major Enabling Objectives in support of the Terminal Objectives for the course will have been established.

2.3.3 IDENTIFYING MINOR ENABLING BEHAVIORS

2.3.3.1 Arrange all of the major enabling level Training Task Cards identified for easy visual scanning.

2.3.3.2 Sort the minor Job Task Cards into groups with the major enabling training behavior statements they support. Any minor job tasks which relate

closely with several major enabling training behavior statements are placed in a separate pile which for now is identified only as the "S & K Pile".

2.3.3.3 Determine the specific training behavior identified by the minor job tasks assigned to each major enabling training behavior statement.

2.3.3.4 On a Training Task Card, write a descriptive training-performance-oriented statement for each minor job task group assigned. These statements are the training behavior elements for the Minor Enabling Objectives that support Major Enabling Objectives, which in turn support Terminal Objectives. (Conditions and standards will be determined and added later.) On each Training Task Card, list the numbers of the minor job tasks that make up each group.

2.4 DETERMINING THE SKILL AND KNOWLEDGE REQUIREMENTS

Each training behavior has identifiable skill and knowledge prerequisites which the student must possess to achieve the training behavior. By applying an analysis process similar to that which produced the Course Job Task Inventory, the skills that must be demonstrated and the knowledge which must be utilized in the performance of the training behavior will be identified.

2.4.1 S & K Required List. As the analysis progresses, a record of the identified skills and knowledge requirements is made. This record is the S & K Required List, Figure 2-23.

2.4.2 Compiling the S & K Required List. Start the process by listing first the minor job tasks from the Course Job Task Inventory which were placed into the "S & K Pile" next to a number on the S & K Required List. The sequential numbering on the list is only a relative thing at this point, and it is therefore insignificant which minor job task is listed next to each number. When listing the minor job tasks from the "S & K Pile" next to a number on the S & K Required List, also list the number by which the task was originally identified on the Course Job Task Inventory. After all minor job tasks from the "S & K Pile" are listed on the S & K Required List, the analysis to identify skills and knowledge requirements not identified as specific job tasks is started.

2.4.2.1 Analysis to Identify Skill and Knowledge Requirements. This analysis is accomplished by a Task Analysis Team which includes subject-matter specialists. Subject-matter specialists are personnel who can thoroughly and correctly perform the identified training tasks. These subject-matter specialists, in addition, must be able to articulate the skills that they are performing and the knowledges they are utilizing in the performance of the training tasks. A member, or members, of the Task Analysis Team performs a training task while the other team members observe. The observers record procedures utilized and spontaneously ask questions during the demonstration to identify and clarify

S & K REQUIRED LIST

1.

2.

3.

4.

5.

6.

7.

8.

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n.

FIGURE 2-23, S & K REQUIRED LIST FORMAT

vague behaviors and indistinct steps or processes involved in the performance. The notations of the observers are then compared and a compilation of the task elements is developed, in terms of skills and knowledges required to perform the task.

2.4.2.1.1 Recording. The skills and knowledges identified during this analysis are added to the S & K Required List and their S & K sequential numbers are recorded on the appropriate Training Task Card under the "remarks section".

2.4.2.1.2 Completing the Analysis. After the first task has been analyzed, a second is selected and the entire process completed for it; then a third, etc. until all tasks in the job have been analyzed. As the second and subsequent tasks are analyzed it will be necessary to list on the S & K Required List only the new skills and knowledge identified and not relist S & K previously listed and identified by number. On the second and subsequent Training Task Cards, it is required that the S & K numbers for all required S & K be listed even though they may have been identified and listed in previous steps, since they are also required for performance of this task.

When this process is completed, the S & K requirements for the successful performance of the training tasks have been identified.

2.5 ASSESSING TARGET POPULATION ENTRY LEVEL

This step is accomplished independent of previous steps. The assessment of Target Population Entry Level can be accomplished after reviewing the Course Mission and defining the target population for the course. Once the target population is identified, data gathering and analysis provides a list of S & K possessed by the target population. This list can be provided by an external activity, such as the NOTAP support activity or developed at the activity where the training is to take place if resources are available; either way the result is a "Target Population S & K List".

2.5.1 S & K SELECTION

The S & K requirements for which training must be conducted are identified by comparing the "S & K Required List" and the "Target Population S & K List". Training must be provided for the S & K requirements that the target population does not possess prior to course entry. This process eliminates much of the unnecessary retraining presently taking place in the Navy, and helps ensure job relevancy in the training that is provided.

2.5.1.1 S & K for Which Training Must be Provided. The reduced list of S & K requirements encompasses behaviors for which training must be provided. Analysis similar to that performed in earlier steps and on-the-job tasks will provide

Training Task Statements for these behaviors from which Learning Objectives will be developed. As the analysis progresses Training Task Cards are developed for these S & K derived behaviors. For these Training Task Statements check the "S & K Req'd" box on the Training Task Card.

At the completion of the process, there will be a number of very specific S & K requirements remaining. These requirements are listed in a format entitled "S & K List for Which Training Must be Provided" that is similar to the original S & K List.

2.6 DETERMINING CONDITIONS FOR TRAINING TASKS BASED ON AN EVALUATION OF THE TRAINING ENVIRONMENT

During the previous analysis processes, conditions for the job tasks based on an evaluation of the job environment were identified and recorded on the Job Task Cards.

2.6.1 Evaluation of Training Environment Conditions. An evaluation of the training environment in which the course is to be conducted will reveal that for each job environment condition identified, one of three situations exists:

- (1) job environment and training environment conditions are identical:
- (2) job environment conditions can be simulated, to some degree, in the training environment, or
- (3) it is impossible, too dangerous, or too costly to simulate job conditions in the training environment.

2.6.1.1 Conditions - Identical. Some elements for each environment may be identical. For example, in aircraft crash crew training, the training environment may be an actual airstrip at a Naval Air Station which is also one of the job environments for the aircraft crash crew.

2.6.1.2 Conditions - Simulated. Some elements of the job environment can be simulated in the training environment. In aircraft crash crew training, "foaming the airstrip" in preparation for an emergency landing, could be simulated by laying down water rather than actual foam.

2.6.1.3 Conditions impossible, too dangerous, or too costly to simulate. Some elements of the job environment are impossible or unreasonable to simulate. The crash landing of an aircraft for crash crew training, though not impossible, is unreasonable.

2.6.2 Conversion from Job Conditions to Training Environment Conditions. By comparing the job environment conditions encountered and the training environment conditions that are identical, or can be reasonably simulated, a list of conditions for each training task is recorded on the Training Task Card.

2.7 DETERMINING STANDARDS OF PERFORMANCE FOR TRAINING TASKS

The job environment standards of performance were previously recorded on the Job Task Cards. These job tasks did not all require the same degree of proficiency to be demonstrated in their performance.

2.7.1 Establishment of Acceptable Performance for the Training Environment. By examining the Course Mission, it can be determined how well the course graduate will be prepared to perform the job.

2.7.1.1 Standard for the Course. This is the broadest level and is specified in the Course Mission.

2.7.1.2 Standards for the Terminal Training Task Statements. It would be unrealistic to believe that the standard of the course is of better quality than the consolidation of the standards of the elements that make up this course standard; therefore, the standard for each terminal training task must be at least equal to the standard established for the course. It is very possible that for some terminal training tasks the standards will be higher than the overall standard for the course, but these standards can never be lower than the established overall course standard.

2.7.1.3 Standards for the Enabling Training Tasks. It then follows that since the terminal training tasks must have standards equal to or higher than the course standard, enabling tasks must have standards equal to or higher than the terminal training tasks which they support. As the training task statements become more specific the trend will be toward higher standards, approaching 100% accuracy as the standard required in the performance of the more minor level enabling training tasks. The standard for any level will always be at least equal to the standards for the next higher level.

2.7.2 Conversion from Job Standards of Performance to Training Standards. With the previous concept in mind, and utilizing the job task standards identified during analysis, the standards for the training tasks are established and recorded on the Training Task Cards.

2.8 DETERMINE EQUIPMENT REQUIREMENTS FOR TRAINING TASKS

The equipments that will be required for conducting the training must be identified as early as possible. In previous steps, equipments utilized in the job environment were identified and recorded. As the design process continues, further decisions relating to the course will eliminate the necessity of some job equipments in the training environment, and will identify additional training equipments required.

2.8.1 Reviewing the Training Task Cards to Identify Training Equipment Requirements. A thorough review of the Training Task Cards will reveal some of the additional equipments required. Alternative equipments may be necessary if various instructional strategies are employed for the training. When the instructional strategies have been preselected it is relatively easy to determine the training equipments required for the training tasks. In the instances where final decisions regarding the selection of instructional strategies have not been made, it will be necessary to identify the training equipments necessary for each alternative.

2.8.2 Recording the Training Equipment Requirements On the Training Task Cards. When the determination of equipment requirements has been made, these requirements are recorded on the appropriate Training Task Cards.

2.8.3 Equipment Requirements List. The equipments required for the training tasks are compiled into an Equipment Requirements List (ERL).

2.9 TRAINING TASK INVENTORY (TTI)

The Training Task Inventory is the output of the Training Task Analysis process. The Training Task Inventory (TTI) consists of the following:

- (1) Training Task Cards, with appropriate data recorded.
- (2) Job Task Cards, with appropriate data recorded.
- (3) S & K List for which Training Must be Provided.
- (4) Equipment Requirements List.

These items will be utilized to complete the Course Design process. The course designers will write the Learning Objectives using the TTI, represented by Figure 2-28, as a base.

3.0 LEARNING OBJECTIVES

Learning Objectives must be written in clear, precise statements that specify what the student will be able to do, under what conditions, and to what degree of proficiency as a result of having received training. A

The identification of the behavioral elements of Learning Objectives and statements concerning conditions and standards will have been accomplished upon completion of the TTA. The completed Learning Objectives must be carefully developed to reflect the complete Training Task Statements listed on the Training Task Cards.

3.1 CHARACTERISTICS OF LEARNING OBJECTIVES

It has already been stated that a complete Learning Objective must not only say what behavior the student must learn to do, but must also specify the

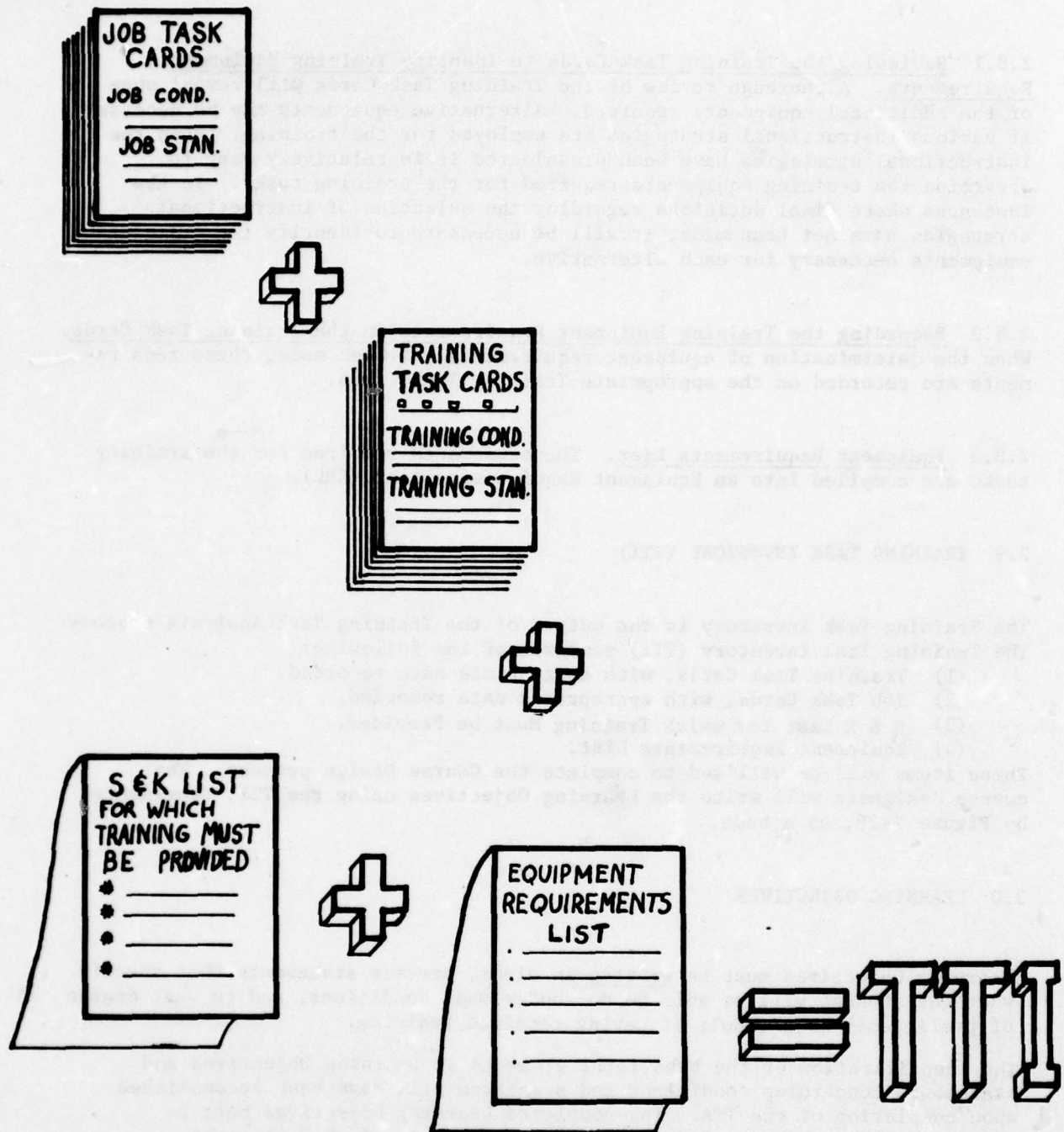


FIGURE 2-28

conditions under which he is to perform and state clearly the proficiency standard he is to achieve. A simple, but direct, example of these three elements is:

Behavior --- Add a column of numbers

Condition --- each containing ten digits, without mechanical assistance.

Standard --- in 2 minutes without error.

3.1.1 BEHAVIOR CHARACTERISTICS

The BEHAVIOR characteristic identifies what the student will do to demonstrate what he has learned --- knowledge applied, skill achieved or attitude demonstrated.

3.1.1.1 Performance-Action Verbs. The action verb expresses the behavior (action) the student will perform to demonstrate achievement of the Learning Objective. Only verbs that express measurable performance, i.e., align, purge, ensure, secure, adjust, type, group, label, turn, etc., shall be used. (See Glossary of Performance Action Verbs, Page 2-6). When in doubt regarding the performance validity of a verb, verify its meaning in a dictionary. Verbs such as "understand", "study", "familiarize", "become acquainted", and "discuss" are vague and do not express desired measurable performance. There is no absolute rule that states that Learning Objectives can contain only one action verb to describe the behavior to be exhibited. There are Learning Objectives that require the use of two verbs to clarify the specific behavior to be attained. The first verb refers to the category of the behavior and the second verb indicates the specific behavioral act required of the student. For example, a learning objective could begin "classify various components of xxx transmitter by writing the name on a drawing of each..."

3.1.2 CONDITION CHARACTERISTICS

The CONDITION characteristics define the LIMITING or AIDING circumstances under which the behavior will be performed. Circumstances are to be selected to clarify the manner in which the behavior is to be demonstrated.

3.1.2.1 Limiting Conditions. A limiting condition sets the limits or restrictions placed on the desired performance. Examples of limiting conditions are indicated by the underlined portions of the following:

1. Load the XYZ program into the computer without losing data contained in memory.
2. Classify received signals with regard to their frequency, modulation, and type of function of the emitter.
3. Don a lifejacket in a darkened room.
4. Compute the surface area of a sphere without the use of a calculator.

3.1.2.2 Aiding Conditions. An aiding condition provides the help or assistance permitted or afforded the student for his performance of the desired behavior. Examples of aiding conditions are indicated by the underlined portions of the following:

1. Trace signal flow through the receiver, using the schematic diagram provided.
2. Align the IF strip of the radio receiver. Use of the technical manual is permitted.
3. Multiply two three-digit numbers, using a slide rule.
4. Type a letter, given a 200-word rough draft.

A Learning Objective may require more than one limiting or aiding condition, or a combination of both aiding and limiting conditions in order to secure the desired behavior. In such cases, additional circumstances can be included. For example, the student could be required to, "Use the proper tools to build a frame house, given boards cut to size."

3.1.3 STANDARD CHARACTERISTICS

The STANDARD characteristic specifies the criterion which the demonstrated behavior must meet. Standards are stated in terms of how well and are usually expressed in terms of accuracy, quality, or time. Examples of accuracy standards are:

1. Must be accurate to three decimal places.
2. Accuracy must be within a tolerance ± 0.0001 .
3. Error of estimate must be no greater than 1 yard.
4. Power emitted must be exactly 100 watts.

Examples of quality standards are:

1. Soldered joint must have a resistance of no greater than 1 ohm.
2. Procedures must be correct as outlined in NAVAIR 01-45AAE2-4,

Section VI.

3. Must withstand shear test of 15.6 pounds.
4. Finished dimensions must be within a tolerance of 0.02 inch in all directions.
5. Format must be correct as prescribed in ...

A time standard normally states the exact amount of time allowed to demonstrate a given behavior. In most cases the standard for criterion test items on a knowledge test will be go-no go (or 100% accuracy).

3.2 WRITING TERMINAL AND ENABLING OBJECTIVES

This process requires the development of two or more levels of Learning Objectives which shall be derived from the completed Training Task Cards produced in the TTA. The levels of Learning Objectives to be developed shall be classified as either Terminal Objectives or Enabling Objectives. Although there will be only one level of Terminal Objectives, it may be necessary to develop more than one level of Enabling Objectives. Each Terminal and Enabling Objective must contain either skill or knowledge behaviors that must be achieved both under observable conditions and to measurable standards.

All Terminal and Enabling Objectives developed will be coded by number from the Training Task Cards developed in the TTA. The behaviors become more specific as they are broken down from the terminal level to the major and minor enabling levels. Achievement of the Enabling Objectives leads to the achievement of the Terminal Objective(s), which leads to the achievement of the Course Mission. All forms of Learning Objectives must be composed of three elements:

1. The Behavior the student must perform;
2. The Conditions under which the behavior will be performed; and
3. The Standard or criterion against which the student performance will be measured.

3.2.1 TERMINAL OBJECTIVES

A three-part Learning Objective, expressed in terms of and keyed to Training Task Cards as developed in the TTA, is a Terminal Objective if it describes the behavioral action, the performance conditions, and the attainment standard (degree of proficiency) expected of the student when he completes the course. In all cases Terminal Objectives express skills, knowledge applications, or attitudes a student would demonstrate on-the-job.

3.2.2 ENABLING OBJECTIVES

A three-part Learning Objective keyed to Training Task Cards is an Enabling Objective if the behavioral action, the conditions, and the attainment standards support the achievement of a Terminal Objective of the course.

Enabling Objectives normally support one Terminal Objective, but in some instances they support more than one Terminal Objective.

3.2.3 USE OF LEARNING OBJECTIVE WORKCARDS

Learning Objectives are written on Learning Objective Workcards as shown in Figure 2-32 (Front and Reverse). The use of these cards will facilitate the grouping and sequencing processes in course development.

TRAINING TASK CARD NUMBER	UNIT/MODULE	LESSON TOPIC
SPECIFY TYPE		
LEARNING OBJECTIVE WORKCARD		
BEHAVIOR		
CONDITION(S)		
STANDARD		
OBJECTIVE (SPECIFY)		
LEARNING OBJECTIVE WORKCARD CNE---		
(OVER)		

FIGURE 2-32 (FRONT) LEARNING OBJECTIVE WORKCARD FORMAT

CRITERION TEST ITEM(S):

REMARKS:

LEARNING OBJECTIVE WORKCARD

CNE---

DATE ---

(BACK)

FIGURE 2-32 (REVERSE) LEARNING OBJECTIVE WORKCARD FORMAT

4.0 COURSE OUTLINE

The Course Outline is the document submitted to higher authority for approval to develop a course. It expresses the content of the course in terms of the Terminal Objectives, and Enabling Objectives required to support each Terminal Objective.

Equipment Requirements for training, with associated cost estimates are included for each selected delivery system alternative.

The Course Outline consists of Front Matter, Learning Objectives List, and the Annex.

4.1 FRONT MATTER

The Front Matter for the Course Outline contains identifying information and specific course data. The Front Matter will consist of the following:

4.1.1 COVER PAGE

The following items will be included (Figure 2-35):

1. The complete title, with no abbreviations, of the course for which the Course Outline is being written.
2. The Name and Address of the activity preparing the Course Outline.
3. The Course Number (if assigned).
4. The Training Agency for which the Course Outline is being prepared.
5. The Date of Preparation of the Course Outline.

4.1.2 COURSE DATA PAGE

The following items will be included (Figure 2-36):

1. Foreword. Statement of the purpose and contents of the Course Outline.
2. Course Mission.
3. Prospective target population description.

The description is an assessment of the target population for which the course will be developed. Include as a minimum; training courses the target population will have completed prior to course entry, special physical requirements, aptitude requirements, experience requirements, security clearance requirements.

4.2 LEARNING OBJECTIVES LIST

The Learning Objectives list is a compilation of the Terminal and Enabling Objectives for which this course will be developed (Figure 2-37).

COURSE OUTLINE

FOR

(COURSE TITLE)

PREPARED BY

(ACTIVITY PREPARING THE COURSE OUTLINE)

(ADDRESS)

(COURSE NUMBER AS ASSIGNED)

PREPARED FOR

(TRAINING AGENCY)

(DATE)

FIGURE 2-35 COURSE OUTLINE COVER PAGE FORMAT

COURSE DATA PAGE

(1) FOREWORD STATEMENT: _____

(2) COURSE MISSION: _____

(3) PROSPECTIVE TARGET POPULATION DESCRIPTION: _____

FIGURE 2-36 COURSE OUTLINE COURSE DATA PAGE FORMAT

LEARNING OBJECTIVES LIST

TERMINAL OBJECTIVE

1.0 _____

ENABLING OBJECTIVES

1.1 _____

1.2 _____

1.3 _____

TERMINAL OBJECTIVE

2.0 _____

ENABLING OBJECTIVES

2.1 _____

2.1.1 _____

2.1.2 _____

NOTE: CONTINUE AS ABOVE UNTIL ALL TERMINAL AND ENABLING OBJECTIVES ARE STATED.

FIGURE 2-37 LEARNING OBJECTIVE LIST FORMAT

4.3 ANNEX

The Annex for the Course Outline is a preliminary Equipment Requirements List. Included in the Equipment Requirements List is information concerning descriptions, quantities of items of equipment required, and cost estimates.

The format for the Equipment Requirements List is shown in Figure 2-39.

4.4 REVIEW AND APPROVAL OF THE COURSE OUTLINE

The designated Course Development Manager prepares the Course Outline for submission when the Course Development Manager Program concept applies (multiple-site training). When single-site training applies the specific training activity functions as the Course Development Manager.

4.4.1 The Course Development Manager submits the Course Outline to CNTECHTRA for appropriate action.

4.4.2 CNTECHTRA reviews the proposed Course Outline and takes appropriate action as directed by higher authority.

4.4.3 When the Course Outline is approved CNTECHTRA directs the Course Development Manager to proceed with the TTA and develop a Curriculum Outline.

5.0 COURSE DEVELOPMENT MANAGER PROGRAM

The Course Development Manager Program is applicable when two or more training activities are tasked with providing identical training (Multiple-Site Training). In such instances, the Chief of Naval Technical Training will designate one of these training activities as the Course Development Manager for the course, and the other training activities as Participating Training Activities.

5.1 Responsibilities of the Chief of Naval Technical Training in the Course Development Manager Program.

5.1.1 General

5.1.1.1 Designate Course Development Managers and Participating Training Activities.

5.1.2 Course Outlines

ESTIMATED EQUIPMENT REQUIREMENTS LIST

A

To implement the Course described in this Course Outline, it is estimated that the following funding will be required:

<u>ICP</u>	<u>AMOUNT</u>
ASO	_____
NSA	_____
NTEC	_____
NAVELEX	_____
NAVAIRSYSCOM	_____
NAVSEASYSYSCOM	_____
etc.	_____

R

TOTAL \$ _____

ESTIMATES ARE BASED ON THE FOLLOWING REQUIREMENTS:

<u>ITEM DESCRIPTION</u>	<u>QUANTITY ON HAND</u>	<u>QUANTITY REQUIRED</u>	<u>PER ITEM COST</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

FIGURE 2-39 EQUIPMENT REQUIREMENTS LIST FORMAT

5.1.2.1 Review Proposed Course Outlines submitted by Course Development Managers for new courses, and take appropriate action as directed by higher authority.

5.1.2.2 Review recommended type "A" revisions to approved Course Outlines for existing courses and take appropriate action as directed by higher authority.

Type "A" Revisions Include: Changes in Course length of a calendar day or more, addition, deletion, or revision to behavior, condition, or standard of learning objectives to the extent that logistics, personnel allocations, and funding requirements will have to be changed. Also conversion of delivery systems necessitated by revised instructional strategy selection.

A

5.1.3 Curriculum Outline

5.1.3.1 Adjudicate unresolvable differences between Course Development Manager and participating Training Activities on Proposed Curriculum Outline content.

5.1.3.2 Review and approve Curriculum Outlines submitted in support of approved Course Outlines.

5.1.3.3 Review and approve recommended type "B" revisions to existing Curriculum Outlines.

Type "B" Revisions Include: Resequencing of units and/or Lesson Topics, reallocations of time between units and Lesson Topics that will not affect overall course length. Revisions of learning objectives (behavior, condition, or standard) to the extent that logistics, personnel allocations, and funding requirements will not have to be changed, and minor revisions in instructional strategies.

A

5.1.4 Support

5.1.4.1 Provide adequate support to Course Development Managers in obtaining the resources necessary to conduct the training prescribed in approved Curriculum Outlines. Support includes: Logistic Support/Facilities, Personnel Allocations/Assignment, Hardware Funding/Procurement, Software Funding/Procurement, and Research and Development Inputs.

5.2 Responsibilities of the Course Development Manager.

5.2.1 Course Outline

5.2.1.1 Develop the Course Outline and submit two copies to the Chief of Naval Technical Training for review and approval when assigned Course Development Manager responsibility for a new course. A

5.2.1.2 Recommend Type "A" revisions to approved Course Outlines for existing courses as necessary based on analysis of external evaluation data.

5.2.2 Curriculum Outline

5.2.2.1 Forward to the Chief of Naval Technical Training, for adjudication, any matters concerning proposed Curriculum Outline content not resolved with Participating Training Activities.

5.2.2.2 Submit two copies of the finalized Curriculum Outline to the Chief of Naval Technical Training for review and approval. A

5.2.2.3 Submit two copies of recommended type "B" revisions to existing curriculum to Chief of Naval Technical Training for approval. A

5.2.3 Instructional Materials

5.2.3.1 Develop instructional materials to support the training prescribed in approved Curriculum Outlines.

5.2.3.2 Provide reproducible copies of instructional materials to Participating Training Activities.

5.2.3.3 Review and implement Type "C" revisions to instructional materials via intra-school memorandum.

Type "C" Revisions Include: Correction of clerical errors, CMI coding errors not affecting learning objectives, revisions to instructional materials as necessitated by approval of Type "A" and "B" revisions, reallocations of time for Lesson Topics of not more than one contact hour per Lesson Topic, addition of teaching/learning activities within the selected instructional strategy and delivery system. A

5.3 Responsibilities of Participating Training Activities in the Course Development Manager Program.

5.3.1 Curriculum Outline

5.3.1.1 Review the proposed Curriculum Outline prepared by the Course Development Manager and submit comments/recommendations to Course Development Manager for consideration, with copy to CNTECHTRA TPC.

5.3.1.2 Recommend and submit to Course Development Manager Type "B" and "C" revisions to existing Curriculum Outlines.

5.3.2 Instructional Materials

5.3.2.1 Reproduce sufficient copies of instructional materials provided to conduct training as prescribed in the approved Curriculum Outline.

5.3.2.2 Recommend Type "C" revisions for instructional materials to Course Development Manager.

SECTION 2 - DEFINITIONS

ACTION VERBS (PERFORMANCE) - Verbs that describe behaviors that are measurable.

ATTITUDE - Mental and emotional acceptance or rejection of a situation or idea.

BEHAVIOR - The action or performance element of a Learning Objective.

CONDITION (AIDING, LIMITING) - Situations, physical or mental, which either aid or limit the behavior of a Learning Objective.

COURSE DEVELOPMENT MANAGER PROGRAM - When two or more training activities are tasked with providing identical training (multiple-site training), the Chief of Naval Technical Training will designate one of these training activities as the Course Development Manager for the course, and the other training activities as Participating Training Activities.

COURSE OUTLINE - The control document of a course which expresses the content of the course in terms of its Terminal and Enabling Objectives. Equipment requirements for training, with associated cost estimates are included as an annex.

COURSE REVISIONS (TYPES A, B, C) -

Type "A" - Changes in Course length of a calendar day or more, addition, deletion, or revision to behavior, condition, or standard of learning objectives to the extent that logistics, personnel allocations, and funding requirements will have to be changed. Also conversion of delivery systems necessitated by revised instructional strategy selection.

A

Type "B" - Resequencing of units and/or Lesson Topics, reallocations of time between units and Lesson Topics that will not affect overall course length. Revisions of learning objectives (behavior, condition, or standard) to the extent that logistics, personnel allocations, and funding requirements will not have to be changed, and minor revisions in instructional strategies.

A

Type "C" - Correction of clerical errors, CMI coding errors not affecting learning objectives, revisions to instructional materials as necessitated by approval of Type "A" and "B" revisions, reallocations of time for Lesson Topics of not more than one contact hour per Lesson Topic, addition of teaching --- learning activities within the selected instructional strategy and delivery system.

A

CRITERION (CRITERIA) - A standard by which a measurement of something can be made.

CRITERION TEST - A test which measures whether or not a student's performance of prescribed behavior, under predetermined conditions, meets the standard specified in one or more Learning Objectives.

CURRICULUM OUTLINE (w/ANNEXES) - A control document of the course expressed in outline form listing Units/Modules and Lesson Topics in their sequential order with the Learning Objectives (Terminal and Enabling) which they support.

ENABLING OBJECTIVES (MAJOR & MINOR) - A Learning Objective is an Enabling Objective if the behavioral action, the conditions, and the attainment standards support the achievement of a Terminal Objective.

INSTRUCTIONAL HARDWARE - Items of material procured and made use of in a course or training program to assist in the presentation of instructional software, such as training aids/devices and shop or laboratory equipment. A

INSTRUCTIONAL MATERIALS - All items of material prepared and made use of in a course or training program as part of the learning process. This includes the general categories of training aids/devices, training equipment, training aids equipment, and instructional literature. D

INSTRUCTIONAL SOFTWARE - Those written and audio/visual materials developed specifically for individual student use in a course such as the narrative, summaries, and programmed instruction forms of the Lesson Topic, and Job Programs. This category of instructional materials also includes tests, computer-generated statements for the student concerning test results, and remedial prescriptions. A

JOB TASK CARDS - A card form used in the TTA to which individual Job Task Statements from the JTI are transferred for convenience of manipulation (grouping & sequencing); additional information is added in the form of job conditions, standards, and equipment lists and related/supporting Job Tasks.

KNOWLEDGE - Specific information, or facts that are required to develop the required skills and desired attitudes to accomplish effectively the jobs, duties, and tasks of a prescribed Naval billet.

LEARNING OBJECTIVE (BEHAVIOR, CONDITION, STANDARD) - A Learning Objective is a clear, concise statement that specifies what the student will do (behavior), under what conditions (condition), and to what degree of proficiency (standard) as a result of having received training.

LEARNING OBJECTIVE WORKCARD - A card form used to develop the Learning Objective in statement form from the separate statements of behavior, condition, and standard taken from the Training Task Cards. The reverse side of the Learning Objective Workcard is used to develop the criterion test item which measures achievement of the Learning Objective.

LESSON TOPIC - The minor sub-division of subject-matter content of a course (group or self-paced) or a training program, designed to assist the student in achieving Learning Objectives (usually Enabling Objectives).

MODULE - A major sub-division of subject-matter content in a self-paced course designed to assist the student in achieving course Learning Objectives (usually Terminal Objectives).

SKILL - The ability to perform a job-related activity which contributes to the effective performance of a job, duty, task in a specified Naval billet.

S & K REQUIRED LIST - A list of skills and knowledges required of the student upon completion of his training.

S & K LIST FOR WHICH TRAINING MUST BE PROVIDED - The difference between the S & K Required List and the Target Population S & K List. This list represents the S & K requirements that must be provided by the course or training program being designed/developed.

STANDARD - The element indicating the degree of proficiency required of the behavior in a Learning Objective. A

TARGET POPULATION - The personnel defined in the course mission for which the course or training program is designed/developed.

TARGET POPULATION ENTRY LEVEL - The degree/extent of proficiency already gained in a particular subject-matter area prior to entering the course or training program.

TARGET POPULATION S & K LIST - A list of skills and knowledges expected to be already possessed by the target population entry-level student.

TERMINAL OBJECTIVE - A Learning Objective is a Terminal Objective if it describes the behavioral action, the performance conditions, and attainment standard (degree of proficiency) expected of the student when he completes the course and/or as performed on the job.

TRAINING ACTIVITY - Naval commands which have as their primary mission the conducting and supporting of training.

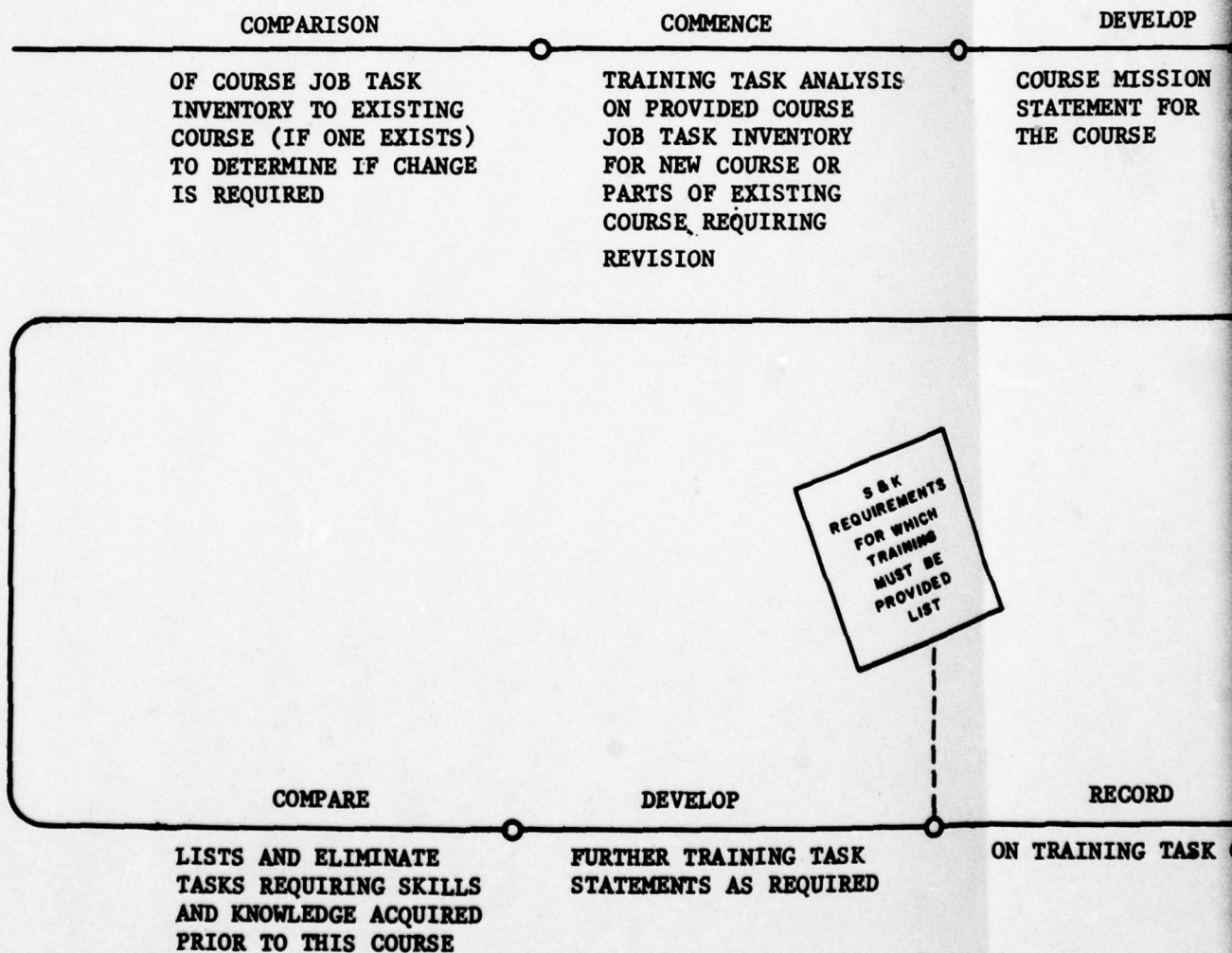
TRAINING AGENCY - A bureau, command, office, or headquarters exercising command of, and providing support to, some major increment of the Navy's total training effort.

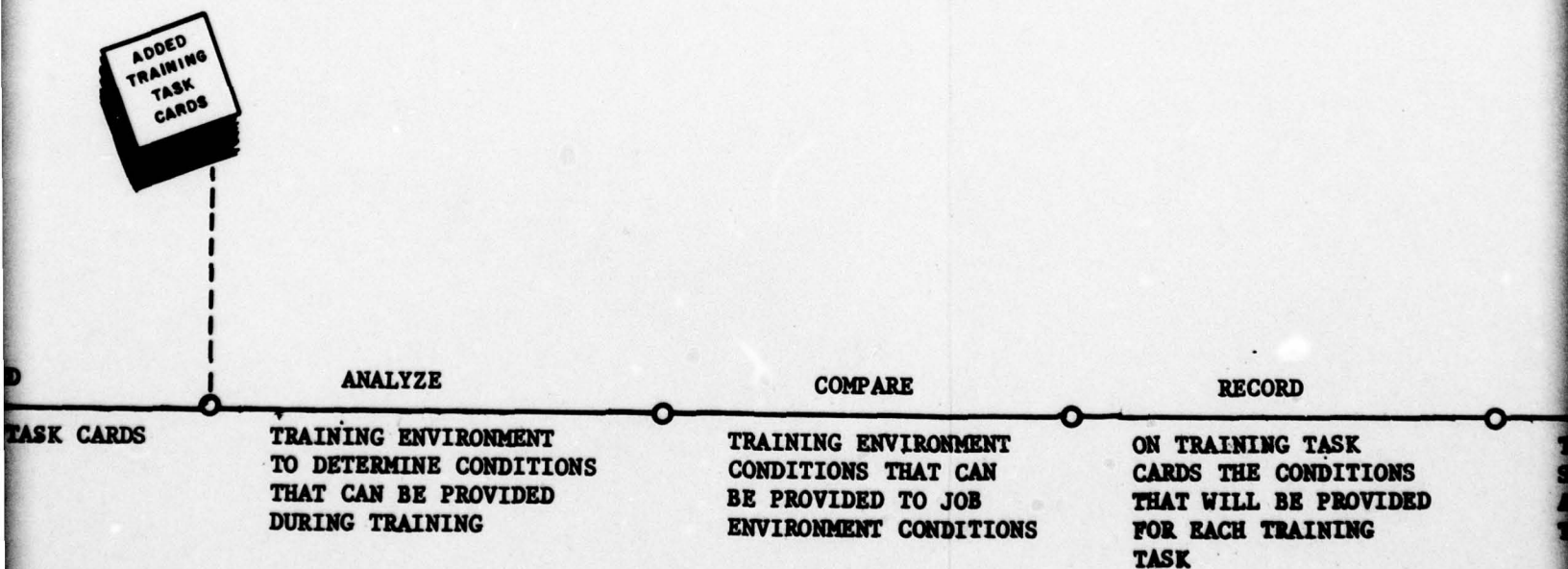
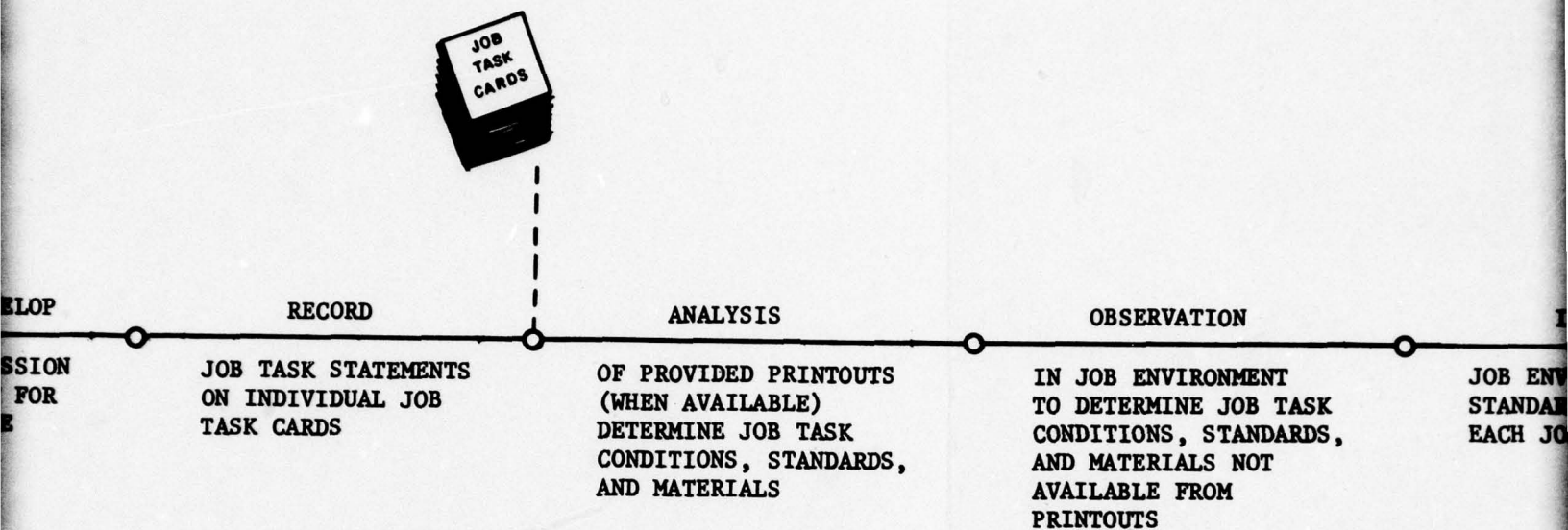
TRAINING TASK CARDS - A card form on which is written a descriptive training behavior-oriented statement (Training Task Statement) that corresponds to a Job Task Statement from the JTI; these Training Task Statements become the behavior elements for Learning Objectives. Additional information is added to the card in the form of training conditions, standards, and equipments required for the performance of the Training Task.

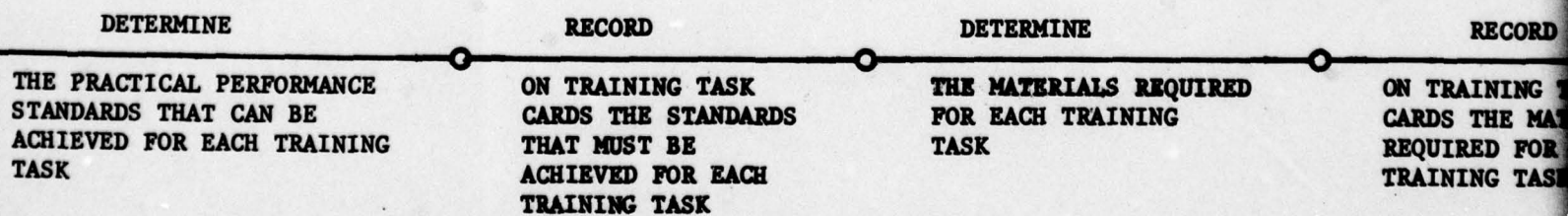
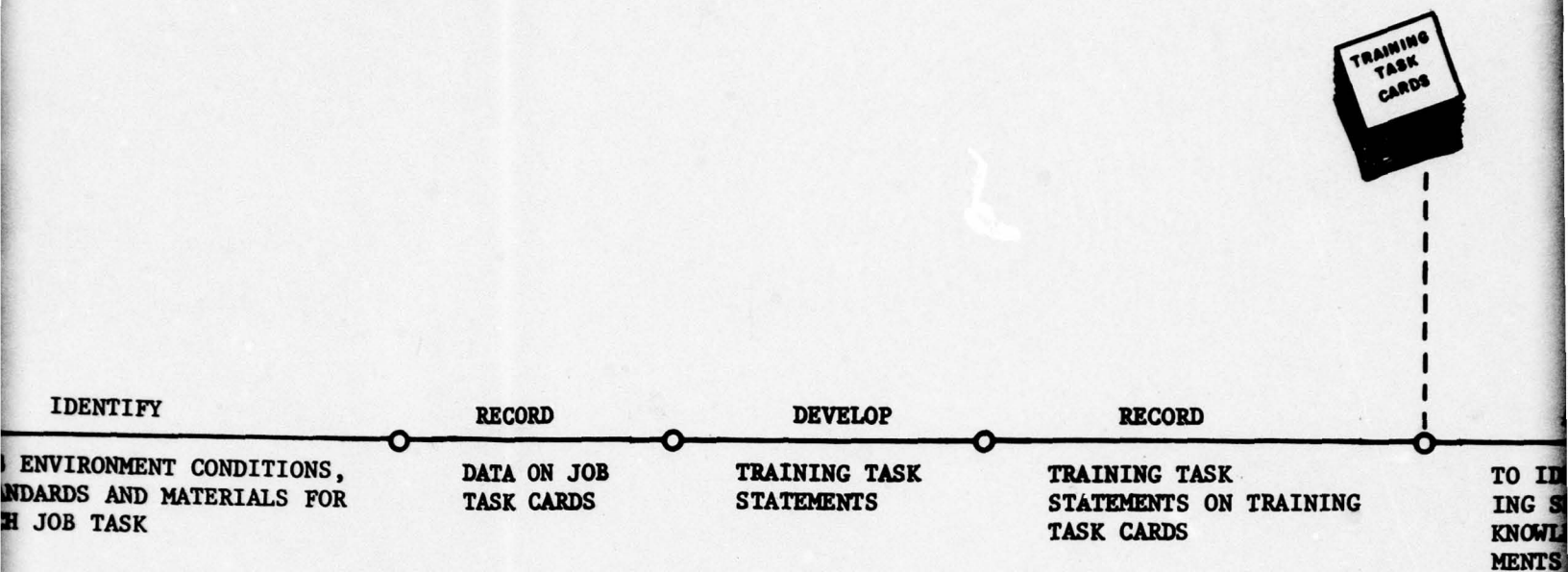
TRAINING TASK INVENTORY - The Training Task Inventory (TTI) consists of Training Task Cards and Job Task Cards, with appropriate data recorded; S and K for Which Training Must be Provided List; and Equipment Requirements List. The TTI is the output of the Training Task Analysis (TTA).

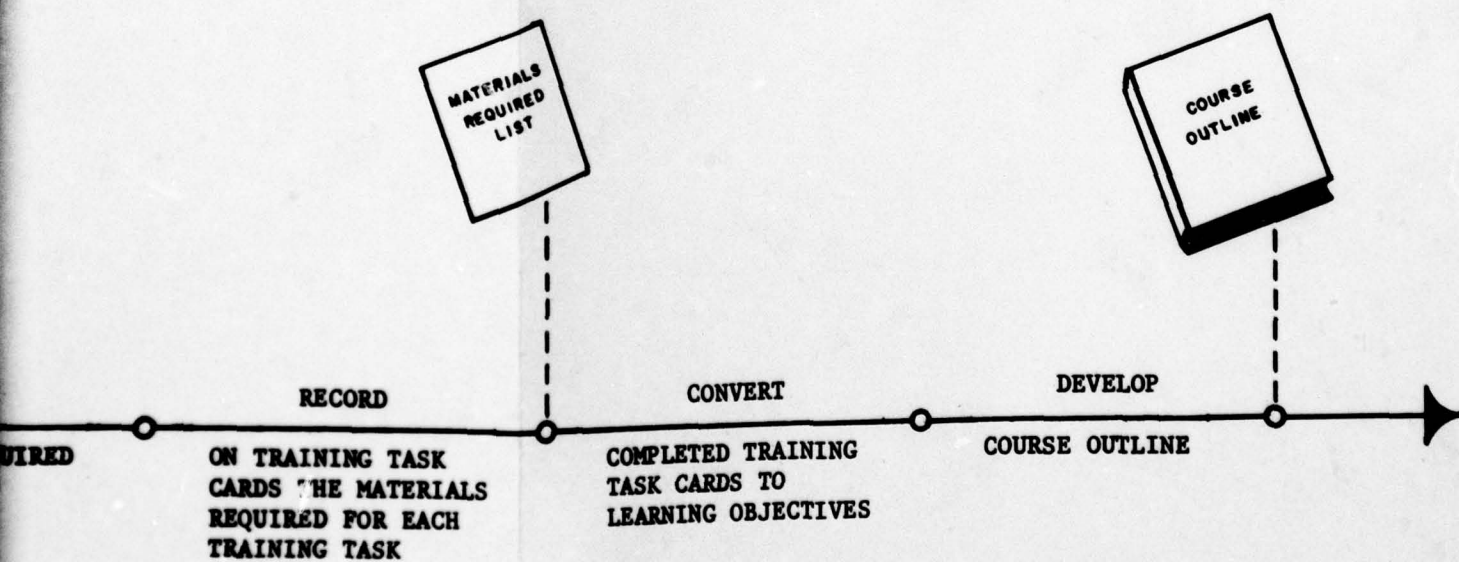
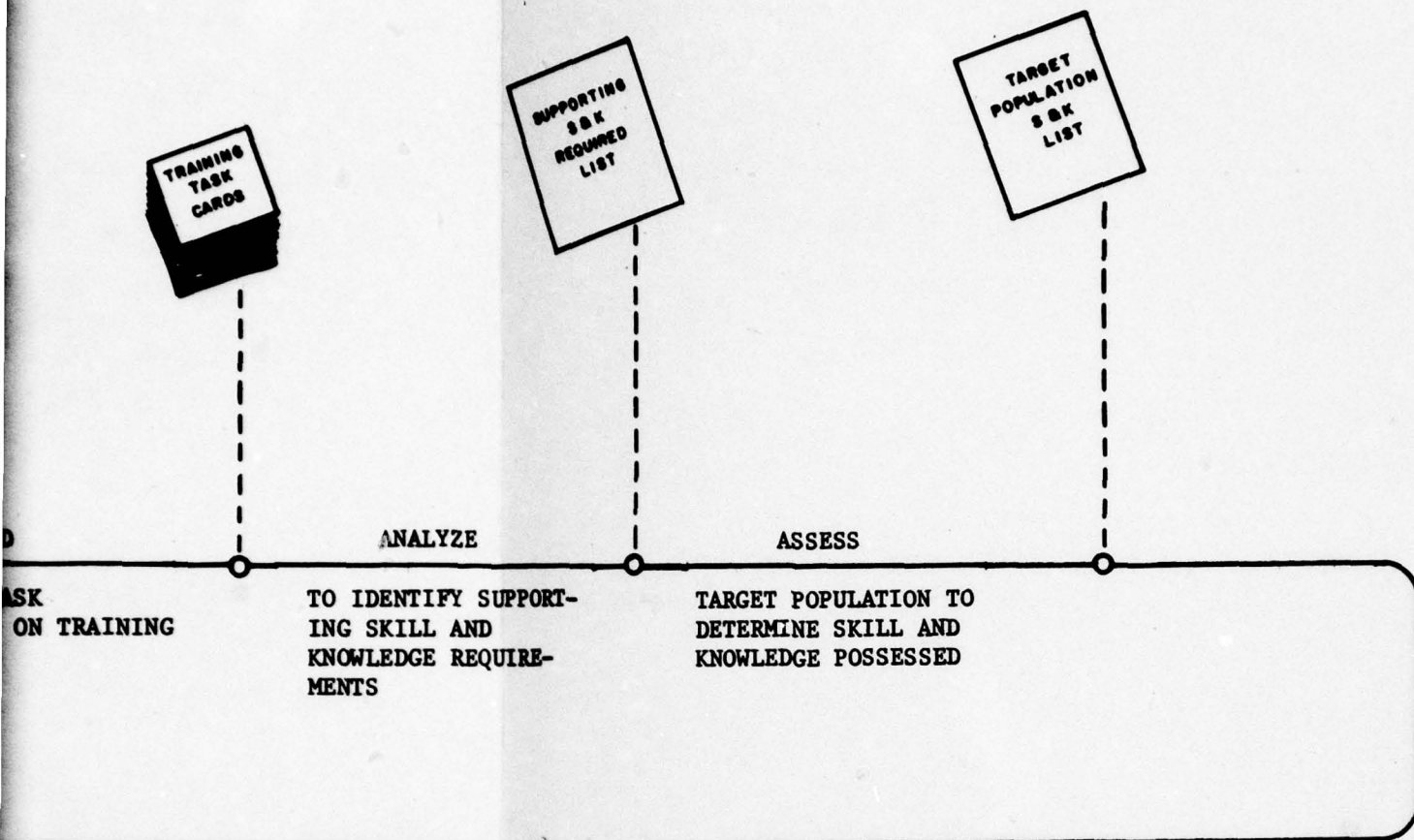
UNIT - The major sub-division of subject-matter content in a group-paced course; a logical grouping of Lesson Topics designed to achieve, wholly or in part, one or more course Terminal Objectives.

COURSE DESIGN









COURSE DEVELOPMENT

Course Development is based upon the Learning Objectives written during the Course Design Process. Course Development includes; developing criterion tests, selecting instructional strategies, sequencing learning objectives, producing the Curriculum Outline and instructional materials, and validation.

CONTENTS

SECTION 3 - COURSE DEVELOPMENT

Chapter 1.0 - Criterion Tests

2.0 - Instructional Strategies

3.0 - Sequencing Objectives

4.0 - Curriculum Outline

5.0 - Development of Instructional Materials

6.0 - Validation

Annex 3-1 Definitions

Annex 3-2 Audit Trail - Foldout (Course Development)

1.0 CRITERION TESTS

An integral part of any instructional program is the testing or measurement aspect. Training is described in terms of Learning Objectives. The measurement of student achievement of each of the Learning Objectives is accomplished by administering tests that provide direct assessment of whether or not the student's performance of the described behavior, under the predetermined conditions, meets the standard (criterion) specified in the Learning Objectives. A Criterion Test references a student's achievement to the Learning Objective standard (criterion), rather than rating his performance against other students being tested. Criterion Testing provides a valid assessment of each student's ability to do what is specified by the Learning Objective, since it reveals the fact that the student can demonstrate the performance required, meeting the specified standard, or he cannot.

1.1 CRITERION TEST DEVELOPMENT

Figure 3-2 provides in block form the basic steps in Criterion Test development. The heavily outlined blocks contain steps pertaining to total Criterion Test development and the remaining blocks pertain to development of each Criterion Test item.

1.1.1 The first two steps refer to assembling information that will be supplied to the test developer who will only have to verify its presence and completeness, and will not make judgments about its accuracy.

1.1.1.1 Criterion Test development begins with the Learning Objectives supplied in Step 1. Since training is described in terms of Learning Objectives, the test developer's goal is to develop a test item for each Learning Objective supplied. The list of Learning Objectives must be accompanied by a supporting Skill and Knowledge Requirements List which will be used in later steps in test development.

1.1.1.2 The information designated in Step 2 must also be provided to the test developer. The relative criticality of each Learning Objective as judged in terms of Course Mission accomplishment, represents data necessary for making decisions and selections later in the test development process.

1.1.2 In Step 3 each Learning Objective must be reviewed by the test developer to ensure the presence of well-defined behavior, conditions and standard. If any of the three elements is missing or if any are unclear, he should consult the Task Analysis Team and, as indicated in Step 4 obtain a clear statement of the missing or confusing element. Performance standards are the most common source of trouble; therefore, to establish a fair and meaningful Pass-Fail criterion for a test item, the developer must have an unequivocal standard of performance to work from.

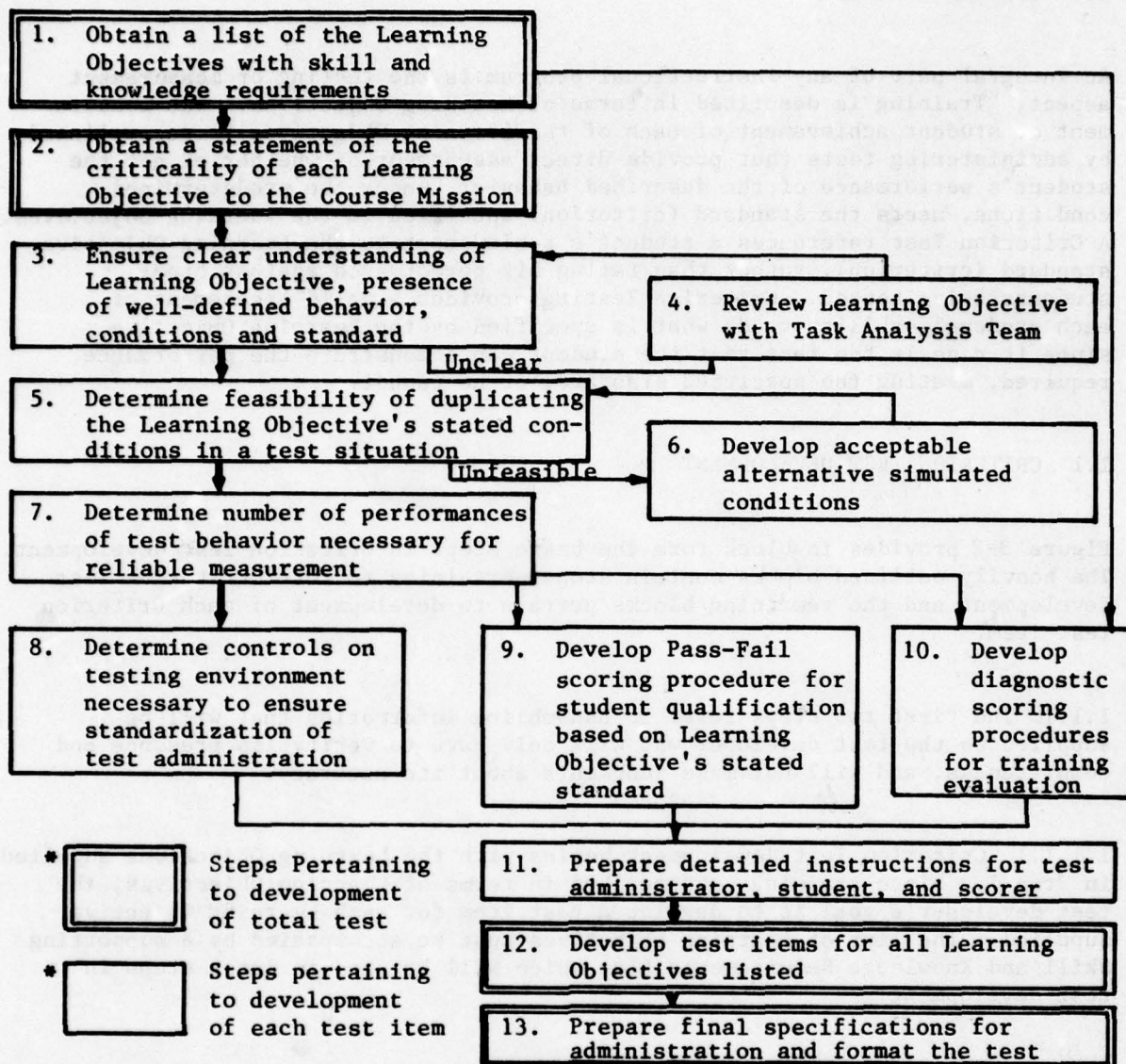


FIGURE 3-2 STEPS IN CRITERION TEST DEVELOPMENT

1.1.3 In Step 5 the developer must determine the feasibility of duplicating in a test situation the conditions called for in the Learning Objective. Normally, well-stated Learning Objectives are blueprints for testing; they dictate what the test conditions will be. Occasionally testing of a Learning Objective requires the use of job-relevant equipment, support personnel, or a time-frame which exceeds the resources available to the test agency. In these instances the developer must carefully weigh the criticality of the Learning Objective (from Step 2) against the cost factors before determining whether or not full realism can be afforded. The developer makes this judgment prudently because invariably some degree of relevance is lost if a Learning Objective cannot be tested under realistic conditions. If it is decided that the conditions stated in the Learning Objective cannot be duplicated in the test situation, acceptable alternatives must be developed as indicated in Step 6. The developer devises techniques and conditions for testing that call for a demonstration as similar as possible to that defined by the Learning Objective. In considering simulation options, developers have a useful check available in the Learning Objective's skill and knowledge requirements. The validity of the alternative technique and conditions can be determined by checking the percentage of skill and knowledge requirements for the Learning Objective that the alternative measures. At the completion of this process the developer directs his efforts to the matter of achieving measurement reliability.

1.1.4 In Step 7 the developer must look at the Learning Objective to determine the number of performances of the behavior required. In most cases this will be explicitly given. For a specific skill, such as installing a carburetor, a single demonstration of the behavior is normally all that is called for. On occasion, with generalized skills or generalized behaviors, the number of performances of the behavior may or may not have been explicitly stated in the Learning Objective. A Learning Objective specifying that something will be done correctly 9 out of 10 times creates no problem for the test item developer, as 10 performances are required. Standards are sometimes phrased in terms of correct performance on a percentage of trials, such as "correct performance on 90 percent of the trials". With this standard the developer must decide on an appropriate number of performances to ensure that student success or failure does not result largely from chance.

1.1.5 Step 8 pertains to another aspect of test reliability--the standardization of the conditions under which a test item is administered. The important factors are the instructions and environmental conditions under which the test item is given. Instructions should be identical for everyone. They should be clearly and simply stated, leaving nothing to the interpretation or misinterpretation of the students taking the test. Things such as the method of scoring and the importance of speed and accuracy should be stressed in the instructions. Also, conditions pertaining to test supplies and environmental factors should be constant for all personnel. Items of equipment worked with or on during testing should be restored to their pretest condition if they are used by successive students. Similarly, environmental factors such as visibility, temperature, attitude of the test administrator, time of day, and the like must be stabilized as much as possible.

1.1.6 In Step 9, a final aspect of measurement reliability is completed. Procedures for translating an observed student performance into a Pass-Fail score must be developed. Provision for this type of scoring should be structured so that only the more reliable human skills are used. That is, the scoring activity should be reduced to one of matching or comparing the test item response with some model of the acceptable response. If the model response on a test of rifle marksmanship is defined as a hole in the bull's-eye, then the scorer has a relatively easy task in judging the acceptability of the response made by the rifleman. Unfortunately, responses for many test items cannot be judged in this "either-or" fashion, but require a "more-or-less" type of judgment. In these cases, the developer must always strive to break down the model response into elements so that comparative judgments can be made by the scorer. This may often entail preparing a checklist of the necessary components or features of the model response.

1.1.7 In Step 10, a supplementary scoring procedure is developed for use in diagnosing reason for student failure on the test item. Pass-Fail scoring is sufficient in meeting the primary mission of quality control, which is the certification of student readiness. However, the secondary mission, that of training program evaluation, is best carried out by providing the trainers not only with the incidence of pass and failure for a Learning Objective but also feedback on why students failed. One way to obtain this data is through a checklist developed from the skill and knowledge requirements of the task-- a checklist to be used by the scorer in recording why the student failed a test item. When accumulated over a number of test item administrations, this diagnostic information will normally provide a stable picture of the reasons for failure which course managers may then use to selectively revise and strengthen their program.

1.1.8 In Step 11, the test developer simply brings together the products of previous steps, and formats the final test item. Detailed instructions to the test administrator concerning test materials, equipment, procedures, precautions, etc., are spelled out. Also, the directions to be read to the student by the test administrator and the scoring procedures should be written.

1.1.9 The last steps in Criterion Test development pertain to assembly and administration of the final form of the test. In Step 12 the development of test items for all Learning Objectives supplied in Step 1 is completed. The test developer's goal is reached with the finalizing and formatting of the total test to be administered. When a course has been properly designed, sufficient time is provided for the measurement of student achievement of all Learning Objectives for the course. The test developer determines training to be provided test administrators and scorers, prepares the final software for the testing, and ensures that scheduling and hardware requirements are met.

1.2 TYPES OF CRITERION TEST ITEMS

Different types of Criterion Test items will be utilized for various applications. In some applications more than one type of test item will be required. Each item, regardless of type, will be used to measure student achievement of the Learning Objective as described previously.

1.2.1 CHECK-LIST TYPE

The check-list type test item is best utilized when measuring achievement of a process or operation consisting of many specific well-defined steps that must be critically integrated or sequentially performed for the process or operation to be successful. The test administrator has a list containing all of the steps, or features that the performance requires and "checks off" these steps as they are accomplished by the student. Since this procedure requires close observation by the test administrator, a one-to-one situation is desirable. Many aspects of the student's performance can be evaluated using this type of test item. Such things as safety precautions, utilization of tools, equipment, facilities, etc. can be included in the check-list with the required performance procedure steps being directly tested. The use of check-list type items is recommended when evaluating critical, complex, or very lengthy performances.

1.2.1.1 Construction

1. Devise a check-list that contains all of the important and essential steps and factors required for successful performance. Include all steps, processes, safety precautions, utilization of tools, equipment, etc. upon which evaluation of the performance will be based.
2. Devise an objective Pass-Fail scoring procedure based on the Learning Objective's stated standard.
3. Develop adequate instructions for the test administrator, the student, and the scorer.

1.2.2 STUDENT FILL-IN TYPE

This type of test item can often be utilized when constant observation of the student demonstration is not required, but a record of how the student arrived at a determination/conclusion or completion is essential to evaluate the performance. The student makes a record of his action by writing a descriptive sentence, phrase, or word on the designated form as he completes the steps or processes involved. The record is evaluated by the scorer without interpretation since the student recorded exactly what he did. Use of the student fill-in type test item is advantageous when a relatively large group of students must be examined by a small group of test administrators.

1.2.2.1 Construction

1. Devise a student fill-in form for the student to record information during testing. Sections of the form are designated for specific information to be recorded. All factors on which the evaluation of the performance will be based will have designated sections for recording information.

2. Devise an objective Pass-Fail scoring procedure based on the Learning Objective's stated standard.

3. Develop adequate instructions for the test administrator, the student, and the scorer.

1.2.3 FINAL-PRODUCT TYPE

This type of test item is used when the process or procedure by which the student arrived at a conclusion or completion is relatively unimportant when compared to the final product or result itself. It has limited application in training environments. The student will be scored only on what the final product or result is compared to the standard model. There is minimum scorer bias introduced since the evaluation will be made by comparing the final product to the standard model.

1.2.3.1 Construction

1. Develop a model of the final product as the standard for evaluation.

2. Determine the dimensions or factors making up the final product that will be compared when evaluating the student's final product.

3. Develop adequate instructions for the test administrator, the student, and the scorer.

1.2.4 COMBINED TYPE

This most prevalent and useful type of test item incorporates some of the better features of the previously mentioned types. It is utilized when the processes or steps and the result are of relatively equal importance. In a critical, complex or lengthy performance requiring a final product of high quality, it may be necessary for valid measurement of student achievement to have a check-list for the test administrator observing the performance, a student fill-in to evaluate factors that are essential but not readily observable, and a model response or standard final product model for comparison of the end result.

1.2.4.1 Construction

1. Devise the recording check-list (if necessary).

2. Devise the student fill-in form (if necessary).

3. Develop the standard model.

4. Develop an objective Pass-Fail scoring procedure based on the Learning Objective's stated standard.

5. Develop adequate instructions for the test administrator, the student, and the scorer.

1.2.5 MULTIPLE-CHOICE TYPE

This type of test item is used primarily to determine the student's ability to recall facts, principles, and concepts specified in the Enabling Objectives of a course. The use of this type of test item is normally limited to evaluating the student's acquisition of knowledge. This type cannot be used as a valid measurement of student achievement of Learning Objectives which involve the acquisition of skills.

1.2.5.1 Construction

1. Determine the behavior called for in the Learning Objective which the item is to test.
2. Devise a problem or question that requires the student to perform the behavior called for.
3. Develop four to six equally realistic alternative solutions to the problem or answers to the question.
4. Evaluate to ensure that only one of them is correct and indisputable.
5. Format the problem or question, and alternatives or choices in a manner such that the correct choices will not be revealed to the student by the arrangement of choices or the grammar used.
6. Develop adequate instructions for the test administrator, the student and the scorer.

1.2.6 COMPLETION TYPE

The completion type of test item requires the student to provide a response rather than select from a list of given responses. Usually it takes the form of a statement with a critical element or elements omitted, to be supplied by the student. Completion (short answer) type test items are not normally input directly to the computer in a CMI course. Rather, the student converts his answers to a machine readable format through the use of an alternative sheet upon completion of the test. A

1.2.6.1 Construction

1. Structure the sequence of the statement so that the element to be supplied comes near or at the end of the statement and represents the element to be supplied by a uniform blank.
2. Ensure that there is no acceptable substitute for the correct response.
3. Develop adequate instructions for the test administrator, the student, and the scorer.

1.2.7 DIRECT-QUESTION TYPE

The direct-question type of test item usually requires an essay-type answer which introduces subjectivity and guessing unless very detailed instructions are developed for the test administrator, the student, and the scorer. It is often used informally for quantitative-type evaluation during the learning

process, but rarely used during formal measurement of student achievement due to the ease of misinterpretation and subjectivity introduced.

1.2.8 MATCHING TYPE

This type of test item is used for measuring student's ability to identify, associate, and discriminate among things similar or related.

1.3 APPLICATION OF CRITERION TEST ITEMS

Regardless of the instructional strategy selected for a course, measurement of student achievement will be accomplished by application of Criterion Test items.

1.3.1 PRE-TESTS

Pre-testing provides information on which to base decisions related to acceleration or remediation of students. There are two categories of pre-tests, course prerequisite pre-tests and course criterion pre-tests.

1.3.1.1 Course Prerequisite Pre-test. This type of pre-test is based on the prerequisite requirements established as necessary for entrance into training. It is not based on the Learning Objectives the students are to achieve during training, but rather on what they have previously learned. The results determine whether or not remediation is required before course entry.

1.3.1.2 Course Criterion Pre-test. This type of pre-test is based on the Learning Objectives of the course. Normally, prospective students will perform very poorly on a course criterion pre-test. Students that perform well on a course criterion pre-test will be considered for acceleration. Acceleration of students where possible, as a result of course criterion pre-testing, effectively reduces time in the training pipeline and eliminates unnecessary retraining. Progress tests taken upon entry into a CMI course may be used in lieu of a course criterion pre-test in determining the optimum point of course entry.

1.3.2 PROGRESS TESTS

Progress Tests are administered at various points in a course (i.e., at the end of units, modules, lesson topics, weeks, etc.). They may include both knowledge and performance tests and are used to measure student achievement of the Learning Objectives to that point. Every item on a progress test is a Criterion Test item. It is not necessary in a Progress Test to retest

the student's achievement of Learning Objectives measured in previous Progress Tests. If he had not achieved the Learning Objectives covered by a previous Progress Test he would not have been permitted to advance further in the course. The emphasis is placed on measurement of the achievement of Learning Objectives not previously tested for which training has been completed. When a student fails a Progress Test he must be remediated and successfully complete an appropriate Re-test prior to progressing further in the course. R

1.3.3 POST-TESTS

A Post-Test, properly designed to test Course Terminal Objectives, individually or in combinations, will serve a useful purpose. A Course Post-Test measures the student's achievement of the Terminal Objectives of a course. Administered at the completion of the course, it provides a valid measurement of the student's ability to perform as specified in the Course Mission. For a relatively long course which could require excessive Post-Testing in one block at the end of the course, the test may be administered in segments. When a course is at the end of the training pipeline, the Post-Test measures the student's job entry qualification. Courses in other areas of the pipeline prepare the student for further training, and course Post-Tests for these courses are comparable to Prerequisite Pre-Tests for succeeding courses. A

2.0 INSTRUCTIONAL STRATEGIES

An instructional strategy is a system (process) for presenting instructional materials designed to achieve Learning Objectives. Instructional strategies for a course are determined when the training (instructional) conditions, methods, and media that are to be utilized in achieving the Terminal Objectives of the course are specified. Every requirement for Naval Technical Training should be carefully evaluated to determine which instructional strategy is most efficient and cost-effective for the particular training requirement. Alternative instructional strategies should be investigated, and corresponding efficiencies and cost-effectiveness should be compared. The study or evaluation of training requirements must establish the feasibility and advisability of adopting a particular instructional strategy before instituting the proposed strategy. Additional guidance can be obtained on other such studies of feasibility and cost-effectiveness that have been and are being conducted. The instructional strategy that has been recommended by CNET to be ultimately utilized in all Naval Technical Training Courses is individualized instruction. Courses that are group-paced will convert to individualized, self-paced instruction if the feasibility study referred to above indicates the advisability of this conversion. CNTECHTRA will set up a priority schedule for conversion of Naval Technical Training Courses from group-paced to self-paced strategy. It will be assumed throughout this manual that reference to self-paced instruction or self-paced courses includes the concept of multimedia course materials which provide for self-paced instruction to be individualized instruction. Relative to CMI course development, included in this instructional strategy are techniques designed to optimize the assignment and sequencing of instructional software, and provide specifications of the detailed remediation procedures required for course coding. In addition to A

the use of multi-media course materials, materials developed in the same medium at two or more levels of difficulty may be used.

2.1 METHODS AND MEDIA

Methods and media exist only as means of effectively achieving the Learning Objectives. The primary consideration in choosing one or a combination of methods and media should be the efficiency and cost-effectiveness of the methods and media in relationship to the achievement of the behavior as stated in the Learning Objectives of a course.

2.1.1 Methods. Methods are more frequently associated with group-paced instruction and are the means, techniques, and procedures of instruction. There are many methods appropriate for use. Included may be such methods as lecture, laboratory, examination, supervised study, demonstrations, use of training aids, group discussions, reviews, demonstration-performance, panel discussions, role playing, case studies, use of programmed instruction materials, tutor, and peer methods. Some methods are adaptable to self-paced instruction, particularly those methods which provide for individual differences, encourage student initiative and decision making, and stimulate individual participation. Figure 3-11 provides in chart form a summary of the relative characteristics of methods of instruction.

2.1.2 Media. Media are the means through which information is made available to the student. Training aids, manuals, televised instruction, and programmed instruction materials, are examples of instructional media. The major consideration for choosing particular methods or media should be training effectiveness and cost, not expediency or ease for those conducting or managing a training program.

2.2 GROUP-PACED INSTRUCTION

Group-paced instruction is instruction developed in a sequence and timed to the progress of the majority of the class. The Learning Objectives will determine the content of all instructional material. The methods selected for group-paced instruction may be varied and are determined by the behaviors stated in the Learning Objectives of the course. The following are representative group-paced methods:

2.2.1 Discussion Method. An interaction between students and an instructor, utilized to explore and analyze instructional content of a Lesson Topic. This method is time consuming and requires knowledge of both the instructor and student.

METHODS	Large Class	Small Class	Single Instructor	Extra Instructor	Special Instructor Training	May Require Special Classroom	Special Equipment	Portrays Desired Behavior	Student Feedback Involved	Student Participation
Individualized Instruction	X				X	X	X	X	X	X
Programmed Instruction	X	X						X	X	X
Tutoring				X					X	X
Field Trip	X					X				X
Symposium	X			X						X
Panel	X			X						
Illustrative Problem	X	X	X			X	X	X		
Role-Playing		X	X		X				X	X
Case-Situation		X	X						X	X
Dramatization	X	X		X				X		
Guided Discussion		X	X		X				X	X
Conference Seminar		X	X		X				X	X
Performance	X	X		X		X	X		X	X
Demonstration	X	X	X			X	X	X		
Lecture	X	X	X							

FIGURE 3-11 CHARACTERISTICS OF METHODS OF INSTRUCTION

2.2.2 Lecture Method. A formal presentation by an instructor to a group (class) of students. There is usually limited student participation and this method can easily deteriorate into a "telling or reading session" by the instructor.

2.2.3 Demonstration-Performance Method. An accurate portrayal by the instructor of the precise behavior necessary to perform the skills and demonstrate the knowledges necessary to perform behavior as stated in the Learning Objectives of a course followed by a repeat performance by the student. The instructor must be knowledgeable and skilled and able to precisely demonstrate each step or process. R

2.2.4 Use of Programmed Instruction Materials Method. Subject-matter content developed in Programmed Instruction format is utilized by a class in accordance with the sequence of the majority of the class.

2.3 SELF-PACED INSTRUCTION

Self-paced instruction is instruction developed in a sequence that allows each student to progress at a rate that is commensurate with his ability. A self-paced course is arranged in instructional modules which include the presentation of the course material in a variety of media through which the student can achieve the Learning Objectives. His choice of the medium which best enables him to acquire the knowledge and skills as stated in the Learning Objectives will come from his experience in using the various media available, and as a result of prescriptive remediation received by him as he progresses in the course. The importance of the student's reading and understanding the Learning Objectives of each Lesson Topic before beginning his study of the Lesson Topic cannot be over-emphasized. R

2.3.1 MEDIA FOR SELF-PACED COURSES

Some of the media available to the student includes:

2.3.1.1 Summary. A condensed version of the material covered in a Lesson Topic.

2.3.1.2 Programmed Instruction (PI). A presentation based on Terminal and Enabling Objectives in sequential order. The material is presented in an optimal stimulus-response-reinforcement sequence which is terminated with a "test situation." The Programmed Instruction medium may be of linear or branching format. The traditional "blocked-off" frame format is not recommended. Adjunctive programs may be used so long as they, like all forms of the Programmed Instruction medium, permit the student to achieve all learning objectives of the Lesson Topic through the use of the Programmed Instruction medium alone. R A

2.3.1.3 Written Narrative (WN). Detailed learning material written in free-flowing prose (textbook format). Narratives should be interspersed with appropriate illustrations, and may provide for limited student response. Readability of the material is a primary factor to consider when the narratives are being written.

2.3.1.4 Audio-Visual. Audio-visual presentations are effective media for helping the student achieve Learning Objectives. Audio-visual devices should be utilized only where there is a valid requirement. A valid requirement exists if it has been determined that the nature of the Learning Objectives of a Lesson Topic is such that audio-visual presentations are necessary to, or will facilitate, the achievement of these learning objectives by the student.

2.3.2 INSTRUCTOR MANAGED INSTRUCTION (IMI) SYSTEM

Instructor Managed Instruction is a system which employs a Learning Supervisor to manage the students' use of a variety of learning resources available in the Learning Center.

2.3.3 COMPUTER MANAGED INSTRUCTION (CMI) SYSTEM

Computer Managed Instruction is a system which employs a computer to manage the students' use of a variety of learning resources available in the Learning Center. These resources are the same resources normally available in IMI, i.e., summary, written narrative, programmed instruction, and audio-visual materials. As IMI becomes more complex and the number of students increases, the interaction of the students with the Learning Supervisor becomes more complicated. A point can be reached where the Learning Supervisor's duties of tracking students and prescribing remediation prevent him from having time to individually tutor or counsel students effectively. A computer to perform the functions of tracking and prescribing remediation frees the Learning Supervisor to interact effectively with the students as a tutor and counsellor.

3.0 SEQUENCING OBJECTIVES

Sequencing Learning Objectives is an incremental building process that will ensure the student the opportunity to acquire knowledges and skills specified in Enabling Objectives prior to being required to demonstrate the ability to perform the terminal behaviors of the course.

The course content must be sequenced in an order that facilitates the students' achievement of the Learning Objectives.

Many factors must be considered when accomplishing the sequencing process. Among them are traditional considerations such as known to unknown, simple to complex, a whole to its parts, or parts to a whole, and consideration based on newer concepts such as matrix analysis, learning domains, and logic and motivation orders. Research is being conducted at present in the latter areas and further information can be obtained by studying references from the Additional Reading List for the Manual.

R

Through rational analysis, a tentative sequence will be determined for the course; the determination of the final sequence will be made during the validation phase of the course development process as discussed later in this section of the manual.

3.1 UNIT/MODULE AND LESSON TOPIC IDENTIFICATION

When all of the Learning Objectives for the course are properly sequenced, the major divisions of the course can be identified in terms of Units/Modules. A quick scan of the sequenced Learning Objectives can reveal "natural breaks." For example, if a course is to provide training on the operation and maintenance of a hardware system, the "natural breaks" would be System Operation, then (depending on the size of the system) Preventive Maintenance (PM), Corrective Maintenance (CM), and System Operation and Maintenance Associated Tasks. In a larger system the PM & CM breaks may encompass such a magnitude of tasks that the divisions would be more properly broken down on the basis of PM & CM on the various sub-systems that comprise the system. The sequence will then be System Operation, PM & CM on sub-systems K, PM & CM on Sub-system N, PM & CM on Sub-system R, (etc. until all sub-systems are completed).

Then System Operation and Maintenance Associated Tasks would again conclude the major Unit divisions.

A similar process applied to each Unit division will reveal the "natural" Lesson Topic Breaks within each unit.

After all divisions of the sequenced Learning Objectives are completed, assignment of descriptive titles to each Unit or Lesson Topic is made.

4.0 CURRICULUM OUTLINE

The Curriculum Outline serves as a planning document for development of specific training materials to be used to conduct a course of instruction. It is an outline form of the course listing Unit/Module Titles and Lesson Topic Titles in their sequential order with the Learning Objectives (Terminal and Enabling) which they support. Curriculum Outlines are used to organize the course of instruction and to ensure that all required subject matter is adequately covered in the course. The Curriculum Outline consists of Front Matter, the Outline of Instruction, and Annexes. A Curriculum Outline in the format presented will be developed for both group-paced and self-paced courses.

CURRICULUM OUTLINE

FOR

(COURSE TITLE)

PREPARED BY

(ACTIVITY PREPARING THE CURRICULUM OUTLINE)

(ADDRESS)

(CANTRAC NUMBER)

PREPARED FOR

(TRAINING AGENCY)

(DATE)

FIGURE 3-15 CURRICULUM OUTLINE COVER FORMAT

4.1 FRONT MATTER

The Front Matter for the Curriculum Outline contains identifying information and specific course data. The Front Matter will consist of the following:

4.1.1 Cover. The following items will be included on the Cover (Figure 3-15):

1. The complete title (ALL CAPS), with no abbreviations, of the course for which the Curriculum Outline is being written. A
2. The name and address of the activity (ALL CAPS) preparing the Curriculum Outline. A
3. The Catalog of Navy Training (CANTRAC) number assigned.
4. The training agency (ALL CAPS) for which the Curriculum Outline is being prepared. A
5. The date of preparation of the Curriculum Outline.

4.1.2 Cover Page. The following items will be included on the Cover Page (Figure 3-17):

1. The complete title (ALL CAPS), with no abbreviations, of the course for which the Curriculum Outline is being written. A
- *2. Estimated course length in contact hours and weeks (Group-Paced Courses), or, Estimated Average Completion Time (Self-Paced Courses). A
3. All locations at which the course will be taught (ALL CAPS). A
- *4. Normal, maximum, and minimum class (section) capacity (Group-Paced Courses) or, maximum input per week (Self-Paced Courses). R
- *5. Instructor requirements, based on planned weekly input (Group-Paced Courses), or, learning supervisor requirements based on maximum input per week (Self-Paced Courses). R
6. The name of the activity preparing the Curriculum Outline.
7. Command exercising curriculum control (ALL CAPS). A
8. Quota management authority (ALL CAPS). A
9. Quota control (ALL CAPS). A
10. Approval/implementation date. A

NOTE: Those items marked with an asterisk (*) on this page and in the following formats indicate items that differ between group-paced and self-paced courses.

4.1.3 FOREWORD

The Foreword is a statement of the purpose and interpretation of the contents of the Curriculum Outline. A Foreword Page will be submitted by the preparing activity as part of the Curriculum Outline. The training agency, upon approval of the Curriculum Outline, will supply a Letter of Promulgation and Distribution.

4.1.4 TABLE OF CONTENTS

The Table of Contents for the Curriculum Outline, (Figure 3-18), will include:

1. Front Matter
 - a. Cover Page
 - b. Foreword
 - c. Course Data Page

COVER PAGE

1. Course Title:
(ALL CAPS) A
- * 2. Course Length: (Estimated) A
 Contact Hours
 Weeks
3. Locations at Which Taught:
(ALL CAPS) A
- * 4. Class (Section) Capacity: A
 Normal
 Maximum
 Minimum
- * 5. Instructors Required Per Class R
 Based on Planned Weekly Input:
6. Activity Preparing Curriculum Outline:
(ALL CAPS) A
7. Command Exercising Curriculum Control: A
(ALL CAPS)
8. Quota Management Authority A
(ALL CAPS)
9. Quota Control A
(ALL CAPS)
10. Approval/implementation date A

FIGURE 3-17 COVER PAGE FORMAT

TABLE OF CONTENTS

FRONT MATTER	PAGE	
Cover Page - - - - -	1	
Foreword - - - - -	11	
Course Data Page - - - - -	v	
OUTLINE OF INSTRUCTION		
Unit/Module 1.0 - Title (IN CAPS) - - - - -	1	A
Lesson Topic 1.1 - Title - - - - -	2	
Lesson Topic 1.2 - Title - - - - -	4	
Lesson Topic 1.3 - Title - - - - -	7	
Unit/Module 2.0 - Title (IN CAPS) - - - - -	9	A
Lesson Topic 2.1 - Title - - - - -	10	
Lesson Topic 2.2 - Title - - - - -	12	
Lesson Topic 2.3 - Title - - - - -	15	
ANNEXES		
Annex 1 - Equipment Requirements Lists - - - - -	77	
Annex 2 - Bibliography - - - - -	80	

FIGURE 3-18 TABLE OF CONTENTS FORMAT

COURSE DATA PAGE

1. COURSE MISSION: _____

2. RECOMMENDED PERSONNEL PHYSICAL REQUIREMENTS: _____

3. SECURITY CLEARANCE REQUIRED: _____

4. RECOMMENDED PREREQUISITE TRAINING: _____

5. PERSONNEL AND RATINGS ELIGIBLE: _____ A

6. OBLIGATED SERVICE: _____ A

7. NOBC/NEC EARNED: _____ A

8. RELATED AND/OR FOLLOW-ON TRAINING: _____ A

9. MODULES SPECIFIED FOR THE RATING: _____ A

FIGURE 3-19 CURRICULUM OUTLINE COURSE DATA PAGE FORMAT

2. Outline of Instruction
 - a. The Unit/Module and Lesson Topic titles sequenced in the order in which the instruction is to be presented.
3. Annexes
 - a. Equipment Requirements Lists
 - (1) Equipment
 - (2) Training Aids
 - (3) Training Aids Equipment
 - b. Bibliography
 - (1) Text Materials
 - (2) References

4.1.5 COURSE DATA PAGE

The following items will be included on the Course Data Page (Figure 3-19):

1. Course Mission
2. Recommended Personnel Physical Requirements
3. Security Clearance Required
4. Recommended Prerequisite Training
5. Personnel and Ratings Eligible
6. Obligated service
7. NOBC/NEC earned
8. Related and/or follow-on training
9. Modules specified for the Rating (a course that encompasses more than one Rating will specify the modules that will be completed by each of the Ratings.

A
A
A
A
A

4.2 OUTLINE OF INSTRUCTION

The Outline of Instruction will be sequenced in the order in which the instruction is to be presented, and will include the estimated time allotments in contact hours for each Unit/Module and Lesson Topic of instruction. The Outline of Instruction will be composed of Unit/Module Pages and Lesson Topic Pages. A Unit/Module Page will precede the set of Lesson Topic Pages that make up that Unit/Module. The Unit/Module Pages and Lesson Topic Pages, when prepared and sequenced for the entire course, present the Outline of Instruction listing the Learning Objectives to be achieved and the estimated allotted time frame (or estimated average time) for their accomplishment.

R

A
A

When the sequence of instruction for the Learning Objectives was determined it may have been discovered that some Terminal Objectives were partially accomplished in several Units/Modules. In other instances it was determined that several Terminal Objectives would be achieved in a single Unit/Module.

4.2.1 UNIT/MODULE PAGES (FIGURE 3-21)

The Unit/Module pages provide an overview of the course in terms of the Terminal Objectives and major time allocations for Units or average times for Modules.

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CHIEF OF NAVAL TECHNICAL TRAINING MILLINGTON TN
PROCEDURES FOR THE PLANNING, DESIGN, DEVELOPMENT, AND MANAGEMEN--ETC(U)
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UNIT/MODULE __.0 INSTRUCTIONAL TITLE

Estimated Contact Hours allotted this unit/module:

Classroom/Learning Center Hours	Laboratory Hours
_____	_____

TERMINAL OBJECTIVES:

Supported Entirely by this Unit/Module

__.0 When the Student Completes This Course _____

__.0 _____

Supported Partially by this Unit/Module and Partially by Units/
Modules __.0 , and __.0

__.0 When the Student Completes This Course _____

FIGURE 3-21 UNIT/MODULE PAGE FORMAT

LESSON TOPIC __. __

TITLE

Estimated Contact Hours Allotted this Lesson Topic:

Classroom/Learning
Center
Hours

Laboratory
Hours

A
D

TERMINAL OBJECTIVES

Supported entirely by this lesson topic:

__.0 When the student completes this course _____

Supported partially by this lesson topic and by Lesson Topics __. __, A
__, etc.:

__.0 When the student completes this course _____

ENABLING OBJECTIVES

Supported entirely by this lesson topic:

When the student completes this lesson topic, he will be able to:

__. (Action verb capitalized) _____

__. (Action verb capitalized) _____

A

FIGURE 3-22 LESSON TOPIC PAGE FORMAT

LESSON TOPIC ____ (Continued)

ENABLING OBJECTIVES: (Continued)

Supported partially by this lesson topic and by lesson topics ____ A

When the student completes this lesson topic, he will be able to:

____ (Action Verb capitalized) _____

____ (Action Verb capitalized) _____

FIGURE 3-23 SECOND AND SUBSEQUENT LESSON TOPIC PAGES FORMAT

4.2.2 LESSON TOPIC PAGES (FIGURE 3-22)

The Lesson Topic Pages provide the detailed description of the course in terms of the Enabling Objectives and estimated Lesson Topic time allocations.

A

If more than one page is needed to list the enabling objectives for a Lesson Topic, the second and successive sheets of Lesson Topic Pages will be in the format as indicated in Figure 3-23.

For Group-Paced Courses the estimated total hours allotted for the Lesson Topics of a Unit must equal the estimated total hours allotted for that Unit. The estimated total hours allotted for the classroom in the Lesson Topics must equal the estimated hours allotted for classroom for the Unit. The estimated total hours allotted for the laboratory in the Lesson Topics must equal the estimated hours allotted for laboratory for the Unit. The estimated total hours allotted for Units is the estimated Course Length in contact hours.

A

A

A

A

A

A

For Self-Paced courses the sum of the estimated average completion times for the Lesson Topics of a Module must equal the Module estimated average time. The sum of the Module estimated average times is the estimated Average Completion Time of the course.

A

A

A

4.3 ANNEXES

Annexes will be submitted as part of the Curriculum Outline. The quantities indicated in the Annex I will be the quantities required based on normal class capacity (maximum input per week, self-paced courses) as indicated on the cover page of the Curriculum Outline.

4.3.1 ANNEX I - EQUIPMENT REQUIREMENTS LIST (FIGURE 3-25, Pages 1-4)

4.3.1.1 Equipment. A listing of all equipment required to conduct this course and specific data relating to this equipment.

4.3.1.2 Training Aids. A listing of all training aids required to conduct this course.

4.3.1.3 Training Aids Equipment. A listing of all training aids equipment required to conduct this course.

4.3.2 ANNEX II - BIBLIOGRAPHY (FIGURE 3-29, Pages 1-3)

4.3.2.1 Text Materials. A listing of all books and manuals dealing with the subject of study of this course, to be used as a principal source of study by the students during this course.



ANNEX I

EQUIPMENT
REQUIREMENTS
LIST

ANNEX I - Equipment

<u>Type</u> <u>Designator</u>	<u>Nomenclature</u>	<u>Federal Stock Number</u>	<u>Quantity</u> <u>Required</u>	<u>Per</u> <u>Item</u> <u>Cost</u>
(AN/Number)	Noun Name	FSN or manufacturer's part number if no FSN assigned		
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

FIGURE 3-25, Page 2 ANNEX I - EQUIPMENT FORMAT

ANNEX I - TRAINING AIDS

<u>Nomenclature</u>	<u>Federal Stock Number</u>	<u>Device Designator Number</u>	<u>Quantity Required</u>
---------------------	-----------------------------	---	------------------------------

AS LISTED IN INDEX TO DIRECTORY OF NAVAL TRAINING DEVICES
COGNIZANCE SYMBOL "2 0"

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

FIGURE 3-25, Page 3 ANNEX I - TRAINING AIDS FORMAT

ANNEX I - TRAINING AIDS EQUIPMENT

<u>Nomenclature</u>	<u>Federal Stock Number</u>	<u>Device Designator Number</u>	<u>Quantity Required</u>
---------------------	-----------------------------	---	------------------------------

AS LISTED IN INDEX TO DIRECTORY OF NAVAL TRAINING DEVICES

COGNIZANCE SYMBOL "2 0"

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

ANNEX II

BIBLIOGRAPHY

FIGURE 3-29, Page 1 ANNEX II - COVER PAGE FORMAT

ANNEX II - TEXT MATERIALS

MILITARY PUBLICATION

NUMBER (MILPUBS)

COMPLETE TITLE

AUTHOR (COMMERCIAL OR CIVILIAN PUBS)

COMPLETE TITLE, PUBLISHING
COMPANY, EDITION, DATE

ANNEX II - REFERENCES

MILITARY PUBLICATIONS

NUMBER (MILPUBS)

COMPLETE TITLE

AUTHOR (COMMERCIAL OR CIVILIAN PUBS)

COMPLETE TITLE, PUBLISHING
COMPANY, EDITION, DATE

4.3.2.2 References. A listing of all publications used by instructors or students for the purpose of obtaining information.

4.4 REVIEW AND APPROVAL OF THE CURRICULUM OUTLINE

4.4.1 The Course Development Manager preparing the proposed Curriculum Outline will forward copies to all Participating Training Activities for review.

4.4.2 Participating training activities will review the proposed Curriculum Outline and submit comments/recommendations to Course Development Manager.

4.4.3 Course Development Manager will review and incorporate recommendations concerning Curriculum Outline content that can be resolved with Participating Training Activities.

4.4.4 Course Development Managers will forward to CNTECHTRA for adjudication any matters concerning Curriculum Outline content not resolved with Participating Training Activities.

4.4.5 Course Development Manager will submit two copies of the finalized Curriculum Outline to CNTECHTRA for review and appropriate approval action.

R

5.0 DEVELOPMENT OF INSTRUCTIONAL MATERIALS

The approved Curriculum Outline must be expanded into appropriate instructional materials for the course. Instructional materials consist of all items prepared, procured, and made use of in a course as a part of the teaching and learning process. This includes the general categories of training aids/devices, training equipment, and written (printed) instructional literature. The instructional strategy selected for a course will have a significant bearing on the forms of written materials to be utilized in the course.

5.1 INSTRUCTIONAL MATERIALS FOR GROUP-PACED COURSES

The Instructor's Guide is the instructor's primary teaching document utilized in a group-paced course. The Student's Guide for Group-Paced courses consists of printed materials developed for student use, to assist him in achieving the Learning Objectives in a fixed course-completion time-frame.

5.1.1 ELEMENTS AND FORMAT FOR INSTRUCTOR'S GUIDE

The Instructor's Guide is a series of Lesson Topic Guides grouped in Units which collectively outline the teaching/learning activities to be accomplished in a group-paced course. The specified activities enhance student achievement of the Learning Objectives in a timely and orderly manner. It is an acknowledged fact that students learn at different paces, thus the teaching/learning activities utilized in a group-paced course are carefully selected, planned, and executed with this fact in mind. Group-paced instruction is the reality resulting from the compromise between the concepts of each and every student totally demonstrating achievement to the maximum degree of qualification possible and its counterpart, exposure to the minimum essentials and no subsequent demonstration of achievement. The graduates of a group-paced course are able to perform acceptably the minimum requirements of the function for which the training was provided. The Instructor's Guide outlines the activity required for student achievement of this level of performance. R

5.1.1.1 Description/Purpose of Instructor's Guide for Group-Paced Course.

The Instructor's Guide Lesson Topic Guides coordinate the instructor and student activities with the outline of instruction for the Lesson Topics. The Outline of Instruction is based on the Curriculum Outline. The instructor and student activities related to the Outline of Instruction are listed adjacent to the appropriate point of instruction. These activities include utilization of training devices, materials, aids, and equipments, techniques and methods, demonstration exercises and applications that collectively enhance the learning process.

5.1.1.2 Elements of the Instructor's Guide. The Instructor's Guide is composed of Front Matter and Lesson Topic Guides grouped in Units which provide the detailed Outline of Instruction and related instructor and student activities sequenced in the same order in which the Learning Objectives are listed in the Curriculum Outline.

5.1.1.2.1 Front Matter for the Instructor's Guide shall consist of the following:

5.1.1.2.1.1 Cover Page. Included on the Cover Page (Figure 3-34):

1. Security classification (if classified, if not - "For Official Use Only").
2. "Instructor's Guide for" (complete course title).
3. Catalog of Navy Training Courses (CANTRAC) Number.
4. Training Activity preparing the Instructor's Guide.
5. Training Agency for which the Instructor's Guide is being prepared.
6. Date

(Security Classification If Classified)
(If Not - "For Official Use Only")

INSTRUCTOR'S GUIDE

FOR

(COMPLETE COURSE TITLE)

(CANTRAC NUMBER)

PREPARED BY

(TRAINING ACTIVITY PREPARING THE INSTRUCTOR'S GUIDE)

PREPARED FOR

(TRAINING AGENCY FOR WHICH THE INSTRUCTOR'S GUIDE IS BEING PREPARED)

DATE

FIGURE 3-34 INSTRUCTOR'S GUIDE COVER PAGE FORMAT

TABLE OF CONTENTS

Front Matter	Page
Foreword	
Table of Contents	
Safety Notice	
How to Use The Instructor's Guide	
 Lesson Topic Guides	
1 - 1 (Title)	
1 - 2 (Title)	
1 - 3 (Title)	
 2 - 1 (Title)	
2 - 2 (Title)	
2 - 3 (Title)	

FIGURE 3-35 TABLE OF CONTENTS FORMAT

HOW TO USE THIS INSTRUCTOR'S GUIDE

(This publication) has been prepared for your use while assigned duties as the instructor for the _____ course. Ample space has been provided for any notes you may wish to make that will help you in the conduct of the course. The lesson topic guides contained in this Instructor's Guide are grouped in units and provide you with the outline of instruction for each lesson topic of this course. The two-column Lesson Topic pages and three-column Outline of Instruction/Instructor Activity/Student Activity pages printed in a horizontal format are developed in sufficient depth to be used as your primary teaching document. No further guide or lesson plan is required. As mentioned, this Instructor's Guide may be personalized by annotation or by the insertion of additional pages if required. This Instructor's Guide was developed from the approved Curriculum Outline for this course and the numbering system is consistent with that utilized in the Curriculum Outline. The outline of instruction is sequenced in the same order in which the learning objectives are listed. When information is not needed in the Instructor Activity or Student Activity columns, information normally printed under the Outline of Instruction column has been printed across the entire page for the purpose of economy.

The two-column Lesson Topic pages contain information that will assist you in preparing yourself for the conduct of instruction in this course. Found therein is the security classification of the lesson topic, the time allotment in contact hours, the listing of all instructional materials for the lesson topic, the objectives as contained in the Curriculum Outline from which this Instructor's Guide was developed, the criterion tests required, and the homework assignments that enhance the student achievement of objectives.

The three-column Outline of Instruction/Instructor Activity/Student Activity pages contain the outline of instruction developed in sufficient depth to be used as the instructor's primary teaching document during the conduct of the instruction, accompanied by the related instructor and student activities that enhance the learning process.

The left-hand column titled "Outline of Instruction" contains the major points to be covered during the lesson topic in full textbook narrative form, or descriptive phrases, or key words as appropriate outlining concepts, theories, descriptions, processes, procedures, etc., that make up the subject matter of the lesson topic.

FIGURE 3-36, Page 1 HOW TO USE THIS INSTRUCTOR'S GUIDE FORMAT

The center column, titled "Instructor Activity" points out the activities which the instructor must carry out during the lesson topic in addition to oral discussion or lecture. In this column are such instructor activities as the projection of specific transparencies, films, slides, etc., the use of charts, wall charts, models, mockups, simulators, demonstrators, etc. and other training aids, devices, materials, etc. These activities are keyed therein to guide you through their use and application as invaluable aids to the teaching/learning process.

The right-hand column, titled "Student Activity" points out those student activities which may not be obvious to the instructor, but will help the student during the acquisition and application phases of the learning process. Activity specified under the "Student Activities" column contributes directly to his achievement of the objectives and development of his ability to do practical work. Items providing guidance include keying the use of the Student's Guide, general and specific directions for classroom, laboratory, workshop time, notes emphasizing observance of personnel and equipment safety precautions and security procedures to be adhered to. Using this Instructor's Guide ensures adherence to the approved plan of instruction for this course and alleviates the tedious chore of rewriting material already contained in the outline of instruction, you merely have to provide your own personalization to the Instructor's Guide in the space provided and your materials will be ready for your professional job of instruction.

FIGURE 3-36, Page 2 HOW TO USE THIS INSTRUCTOR'S GUIDE FORMAT

5.1.1.2.1.2 Foreword Page. The Foreword is a statement of the purpose and interpretation of the contents of the Instructor's Guide. A Foreword Page will be submitted by the preparing activity as part of the Instructor's Guide. The Course Development Manager, upon approval of the Instructor's Guide, will supply a Letter of Promulgation.

5.1.1.2.1.3 Table of Contents (Figure 3-35)

5.1.1.2.1.4 Safety Notice. Required for those items peculiar to the process, system, or equipment involved.

5.1.1.2.1.5 How to Use This Instructor's Guide (Figure 3-36, Pages 1-2)

5.1.1.2.2 Lesson Topic Guide Page Numbering. Lesson Topic Guides are composed of two-column pages called "Lesson Topic" pages, followed by three-column pages called "Outline of Instruction/Instructor Activity/Student Activity" pages, printed in a horizontal format. Pages are identified by a three-part number which is derived from the Unit and Lesson Topic numbering used in the Curriculum Outline. The first and second parts of the three-part page number indicates the related Lesson Topic in the Curriculum Outline, the third part indicates the page sequence in the Lesson Topic Guide. For example: 2-3-14 indicates that this page of the Lesson Topic Guide is the 14th page in the Lesson Topic Guide for Curriculum Outline Lesson Topic 2-3. The first "Lesson Topic" page of a Lesson Topic Guide will carry as the third part of the three-part page number, the number "1". The last "Outline of Instruction/Instructor Activity/Student Activity" page of that Lesson Topic Guide will carry the highest number in the sequence. Thus, in a 20-page Lesson Topic Guide for Curriculum Outline Lesson Topic 2-3 the first Lesson Topic page would be 2-3-1 and the last Outline of Instruction/Instructor Activity/Student Activity page would be 2-3-20. If, when an instructor is personalizing his copy of the Lesson Topic Guide, he finds it necessary to add complete pages as annotations he should add an alphabetic addition to the three-part page number carried on the previous sheet to derive his page number; for example, if he adds two pages immediately after page 2-3-14 of a 20-page Lesson Topic Guide, his additional pages will be numbered 2-3-14A and 2-3-14B.

5.1.1.2.2.1 Lesson Topic Pages. The two-column Lesson Topic pages contain information that will assist the instructor in preparing himself for the conduct of instruction in the course. The information contained on the Lesson Topic pages, (Figure 3-39, Pages 1-2), includes:

5.1.1.2.2.1.1 The Training Activity preparing the Lesson Topic guide.

5.1.1.2.2.1.2 Course Title and CANTRAC. Complete and unabridged as it appears in the Catalog of Navy Training Courses (CANTRAC).

(TRAINING ACTIVITY PREPARING LESSON TOPIC GUIDE)

Date

(Course Title and CANTRAC #)

(Security Classification)

(Lesson Topic # and Title)

(Time Allocation: Class & Lab)

INSTRUCTIONAL MATERIALS:

(Texts)

(References)

(Slides)

(Transparencies)

(etc.)

INSTRUCTIONAL MATERIALS (CONT'D)

TERMINAL OBJECTIVES

Supported entirely by this lesson topic:

#

#

Supported partially by this lesson topic:

#

#

ENABLING OBJECTIVES

Supported entirely by this lesson topic:

#

#

ENABLING OBJECTIVES (CONT'D)

- # _____
- # _____
- # _____
- # _____

A Supported partially by this lesson topic:

CRITERION TESTS

- _____
- _____
- _____
- _____
- _____
- _____
- _____

HOMEWORK (CONT'D)

- _____
- _____
- _____
- _____
- _____
- _____

FIGURE 3-39, Page 2 LESSON TOPIC PAGE FORMAT, SECOND AND SUBSEQUENT PAGES

5.1.1.2.2.1.3 Security Classification. The security classification assigned the material in the Lesson Topic.

5.1.1.2.2.1.4 Lesson Topic Number and Title. Same as contained in the Curriculum Outline.

5.1.1.2.2.1.5 Time Allocation. The same as contained in the corresponding Curriculum Outline Lesson Topic page.

5.1.1.2.2.1.6 Instructional Materials. Those necessary for conducting this Lesson Topic. Include under subheading as appropriate; texts, references, transparencies, slides, films, charts, wall charts, mockups, simulators, demonstrators, and other training aids, devices, and other instructional materials for this Lesson Topic.

5.1.1.2.2.1.7 Terminal Objectives. Same as those listed in the corresponding Curriculum Outline Lesson Topic page, Figure 3-22. A

5.1.1.2.2.1.8 Enabling Objectives. Same as those listed in the Curriculum Outline Lesson Topic page.

5.1.1.2.2.1.9 Criterion Tests. Applicable to this Lesson Topic (if any).

5.1.1.2.2.1.10 Homework. To be assigned to assist the student in achievement of the Learning Objectives of this Lesson Topic.

5.1.1.2.2.1.11 Page Number. As discussed in 5.1.1.2.2.

5.1.1.2.2.2 Outline of Instruction/Instructor Activity/Student Activity Pages. The three-column Outline of Instruction/Instructor Activity/Student Activity pages, (Figure 3-42), contain the Outline of Instruction developed in sufficient depth to be used as the instructor's primary teaching document during the conduct of the instruction, accompanied by the related instructor and student activities that enhance the learning process.

5.1.1.2.2.2.1 Outline of Instruction Column. The left-hand column of the three-column Outline of Instruction/Instructor Activity/Student Activity page is where the major points to be covered during the Lesson Topic are listed in full textbook narrative form, or descriptive phrases, or key words as appropriate, outlining concepts, theories, descriptions, processes, procedures, etc., that make up the subject-matter of the Lesson Topic.

OUTLINE OF INSTRUCTION

INSTRUCTOR ACTIVITY

STUDENT ACTIVITY

1.		
2.		
3.		
4.		

FIGURE 3-42 OUTLINE OF INSTRUCTION/INSTRUCTOR ACTIVITY/STUDENT ACTIVITY PAGE FORMAT

5.1.1.2.2.2.2 Instructor Activity Column. The center column of the three-column Outline of Instruction/Instructor Activity/Student Activity page is where the activities, other than oral discussion or lecture, are listed which the instructor must carry out during the Lesson Topic. In this column are keyed such instructor activities as the projection of specific transparencies, films, slides, etc., the use of charts, wall charts, models, mockups, simulators, demonstrators, etc., and other training aids, devices, materials, etc. used for demonstrations, presentations and other activities that through their use and application are invaluable aids in the teaching/learning process.

5.1.1.2.2.2.3 Student Activity Column. The right-hand column of the three-column Outline of Instruction/Instructor Activity/Student Activity page is where those student activities are listed which may not be obvious to the instructor, but will help the student during the acquisition and application phases of the learning process. Listed are student activities which contribute directly to student achievement of the Learning Objectives and development of student ability to do practical work. Items providing guidance include keying the use of the Student's Guide, general and specific directions for classroom, laboratory, and shop time; also notes emphasizing observance of personnel and equipment safety precautions and security procedures to be followed.

5.1.1.2.2.2.4 Economy Considerations. When information is not needed in the Instructor Activity and Student Activity columns, information normally printed in the Outline of Instruction column can be printed across the entire page.

5.1.1.2.2.2.5 Personalization by Annotation. When the Instructor's Guide is finalized in the prescribed format for printing, ample space should be provided R throughout for instructor personalization.

5.1.1.3 Review and Approval.

5.1.1.3.1 The Instructor's Guide is developed by the Course Development Manager to support the training prescribed in the approved Curriculum Outline.

5.1.1.3.2 The Course Development Manager will provide reproducible copies to Participating Training Activities.

5.1.2 THE STUDENT'S GUIDE FOR GROUP-PACED COURSES

The Student's Guide for group-paced courses is a series of instruction sheets which collectively provide the student with the Learning Objectives and self-help materials such as reading assignment, study questions, problems, job steps, self-test items, diagram sheets, and other supplementary information

to assist him to successfully complete the course, and subsequently perform acceptably on the job.

5.1.2.1 Use of the Student's Guide. The Student's Guide does not duplicate existing documents and manuals, but rather is designed to be used in conjunction with them as software training material for a course.

5.1.2.2 Elements of a Student's Guide for group-paced courses. A Student's Guide is composed of Front Matter and Instruction Sheets.

5.1.2.2.1 Front Matter. Front Matter for each volume of the Student's Guide shall consist of the following:

5.1.2.2.1.1 Cover Page. Included on the Cover Page (Figure 3-45):

1. Security Classification (if classified, if not - "For Official Use Only")
2. "Student's Guide For" (complete course title)
3. (CANTRAC) Number
4. Volume Number
5. Training Activity preparing the Student's Guide
6. Training Agency for which the Student's Guide is being prepared
7. Date

5.1.2.2.1.2 Foreword Page. The Foreword is a statement of the purpose and interpretation of the contents of the Student's Guide. A Foreword Page will be submitted by the preparing activity as part of the Student's Guide. The Course Development Manager, upon approval of the Student's Guide, will supply a Letter of Promulgation.

5.1.2.2.1.3 Table of Contents (Figure 3-46, Pages 1-2)

5.1.2.2.1.4 Safety Notice. Required for those items peculiar to the process, system, or equipment involved.

5.1.2.2.1.5 How to Use The Student's Guide. Figure 3-48 contains information for the student that will assist him in using the guide.

5.1.2.2.2 Instruction Sheets. Consist of printed pages that aid the student in the acquisition of the subject matter for the course.

5.1.2.2.2.1 Instruction Sheet Identification. Each type of instruction sheet has an identifying number that identifies the Unit, Lesson Topic, and sheet sequence. A letter following the sheet sequence number identifies the

(Security Classification if Classified)
(If Not - "For Official Use Only")

STUDENT'S GUIDE
FOR
(COMPLETE COURSE TITLE)
(COURSE CATALOG NUMBER)

VOLUME N
PREPARED BY
(TRAINING ACTIVITY PREPARING THE STUDENT'S GUIDE)

PREPARED FOR
(TRAINING AGENCY FOR WHICH THE STUDENT'S GUIDE IS BEING PREPARED)

DATE

FIGURE 3-45 STUDENT'S GUIDE COVER PAGE FORMAT

TABLE OF CONTENTS

FRONT MATTER

PAGE

Foreword (Letter of Promulgation)

Table of Contents

List of Illustrations (if applicable)

Safety Notice

How to Use This Student's Guide

Security Classification Information (if applicable)

Information Sheets

1 - 1 - 1I Title

1 - 1 - 2I Title

(If Volume 1)

1 - 2 - 1I Title

2 - 1 - 1I Title

Assignment Sheets

1 - 1 - 1A Title

1 - 2 - 1A Title

(If Volume 2)

1 - 3 - 1A Title

Notetaking Sheets

1 - 1 - 1N Title

1 - 2 - 1N Title

Job Sheets

1 - 1 - 1J Title

1 - 2 - 1J Title

FIGURE 3-46 TABLE OF CONTENTS FORMAT

Diagram Sheets

1 - 1 - 1D Title
1 - 1 - 2D Title
1 - 1 - 3D Title (SH 1 of 3)
1 - 1 - 3D Title (SH 2 of 3) (If Volume 3)
1 - 1 - 3D Title (SH 3 of 3)
1 - 1 - 4D Title
1 - 2 - 1D Title
1 - 2 - 2D Title

Assignment Sheets

1 - 1 - 1A Title
1 - 2 - 1A Title
1 - 3 - 1A Title

Notetaking Sheets

1 - 1 - 1N Title
1 - 2 - 1N Title
1 - 3 - 1N Title

(If combined Volume 1&2)

Information Sheets

1 - 1 - 1I Title
1 - 2 - 1I Title

Job Sheets

1 - 1 - 1J Title
1 - 2 - 1J Title

HOW TO USE THE STUDENT'S GUIDE

(This publication) has been prepared for your use while _____.

You may make any notes that will help you for your review later in this course, or that will help you when you are on your job at your next duty assignment.

(Other Publications) with which this student's guide was designed to be used include:

(This volume) contains the following types of instruction sheets:

*Information Sheets - Which amplify, correct, or supplement the information in the technical manuals or other course text materials.

*Assignment Sheets - For each lesson topic to direct your homework study efforts.

*Notetaking Sheets - Containing both pre-printed matter and ample blank space for personal note taking.

*Job Sheets - Providing job steps for development of job skills where practical work must be performed.

*Diagram Sheets - Ranging from graphs, charts, etc. through schematic diagrams.

*NOTE: List the types of instruction sheets for the particular volume as applicable (see 5.1.2.3 for guidance)

A

Safety - As applicable - refer student to Safety Notice in Front Matter.

Security - As applicable - refer student to Security Classification Information in Front Matter.

FIGURE 3-48 HOW TO USE THE STUDENT'S GUIDE FORMAT/SAMPLE

INFORMATION SHEET x-x-xI

(TITLE)

INTRODUCTION

REFERENCES

INFORMATION

FIGURE 3-49 INFORMATION SHEET FORMAT

ASSIGNMENT SHEET

x-x-xA

(TITLE)

LESSON TOPIC OBJECTIVES

- # _____
- # _____
- # _____
- # _____

STUDY ASSIGNMENT

- _____
- _____
- _____
- _____

STUDY QUESTIONS

1. _____
2. _____
3. _____

FIGURE 3-50 ASSIGNMENT SHEET FORMAT

type of instruction sheet; "A" - Assignment Sheet, "I" - Information Sheet, "N" - Notetaking Sheet, "J" - Job Sheet, "D" - Diagram Sheet, for example, "3-2-1I" (Unit, Lesson Topic, Sheet, Type) signifies the first Information Sheet for the second Lesson Topic of the third Unit.

5.1.2.2.2.2 Information Sheets. Information Sheets, (Figure 3-49), contain the following essential elements.

5.1.2.2.2.2.1 Introduction. The introduction consists of a brief statement of the purpose, scope, and value of the information sheet.

5.1.2.2.2.2.2 References. The references provide complete identification of all reference material utilized in compiling the information.

5.1.2.2.2.2.3 Information. The information includes new concepts, technological updates, and amplifying, corrective, or supplemental information when the technical manuals or other course texts do not contain sufficient related information for instructional purposes. The information must be written at the level of the students entering the course. Illustrations may be used where they will aid in understanding the written information.

5.1.2.2.2.3 Assignment Sheets. Assignment Sheets, (Figure 3-50), contain the following essential elements:

5.1.2.2.2.3.1 Lesson Topic Learning Objectives. The Lesson Topic Learning Objectives included here are the same as for the corresponding Lesson Topic in the Instructor's Guide.

5.1.2.2.2.3.2 Study Assignment. Provides specific study instructions identifying paragraphs, pages, and publications. If there is a best sequence to study scattered portions of the text, the sequence is given.

5.1.2.2.2.3.3 Study Questions. Provide thought-provoking questions on the important portions of the assignment. Preference is given to those types of questions that require mental decisions similar to those the student would make on the job, and that measure the student's accomplishment of the Learning Objectives.

5.1.2.2.2.4 Notetaking Sheets. Notetaking sheets, (Figure 3-52), are utilized during Lesson Topics by the student to record important information for convenient reference. They contain the following essential elements:

5.1.2.2.2.4.1 References. Provide the complete identification of all reference publications pertinent to the Lesson Topic.

5.1.2.2.2.4.2 Notetaking Outline. Contains an outline of the subject-matter headings of the associated Lesson Topic Guide. Adequate space is provided for the student to take notes. Items such as new definitions should be printed in their entirety.

5.1.2.2.2.5 Job Sheets. Provide job steps for development of job skills where practical work must be performed. Job Sheets, (Figure 3-53), contain the following essential parts:

NOTETAKING SHEET

x-x-xN

(TITLE)

REFERENCES

NOTETAKING OUTLINE

FIGURE 3-52 NOTETAKING SHEET FORMAT

JOB SHEET x-x-xJ

(TITLE)

INTRODUCTION

REFERENCES

EQUIPMENT AND MATERIALS

JOB STEPS

1.

2.

INSTRUCTOR'S INITIALS

3.

N.

SELF TEST ITEMS

1.

2.

FIGURE 3-53 JOB SHEET FORMAT

5.1.2.2.2.5.1 Introduction. Consists of a brief statement of purpose, scope, and value of the job sheet.

5.1.2.2.2.5.2 References. Provide complete identification of all publications referenced in the job steps.

5.1.2.2.2.5.3 Equipment and Materials. Contains a listing of all equipment, tools, and materials necessary for the performance of the job steps.

5.1.2.2.2.5.4 Job Steps. Provided here are detailed procedures for performing assigned tasks. If the job steps contained in the technical documentation utilized in the course are in sufficient detail, the student shall be referred to the proper page of the appropriate technical document to perform them, rather than reproducing them here in the job steps section of the job sheet. Provisions should be made for the instructor's initial or checkmark at appropriate points in the job steps. Such points include: just prior to entering a potentially hazardous step; verification of observation; or points where the next and successive steps would be useless or invalid if the previous step were incorrect.

5.1.2.2.2.5.5 Self-Test Items. Provide thought-provoking questions on the performance of the job steps. The self-test items constitute an "open book" test, they permit the student to use information in the technical manuals and other course material in arriving at the solutions, and are designed to measure his comprehension of the procedures.

5.1.2.2.2.6 Diagram Sheets. Diagram sheets may range from complete foldout schematic and block diagrams or flow charts, to sample sketches or graphs. Diagram sheets may sometimes contain blank portions to be completed by the student. These sheets are provided for use in class and for follow-up review and study during application.

When a diagram sheet is identical to an existing drawing, such as a block or schematic drawing in a technical manual, the diagram sheet identification number shall be added and the drawing reproduced in its existing form.

5.1.2.3 Student's Guide Assembly. Student's Guides are assembled in three volumes.

5.1.2.3.1 Volume 1. Contains all Information Sheets.

5.1.2.3.2 Volume 2. Contains Assignment Sheets, Notetaking Sheets, and Job Sheets.

5.1.2.3.3 Volume 3. Contains Diagram Sheets.

5.1.2.3.4 Combined Volume 1 & 2. In courses requiring a small number of instruction sheets, the Information Sheets, Assignment Sheets, Notetaking Sheets and Job Sheets may be bound together in one volume designated Volume 1 & 2. If this is done, Volume 3 will be retained and consist of Diagram Sheets as before.

5.1.2.3.5 Instruction Sheet Grouping. The Instruction Sheets are grouped by Lesson Topic identification rather than by sheet type in the physical assembly of the Student's Guide.

5.1.2.4 Review and Approval.

5.1.2.4.1 The Student's Guide will be developed by the Course Development Manager to support the training prescribed in the approved Curriculum Outline.

5.1.2.4.2 The Course Development Manager will provide reproducible copies to Participating Training Activities.

5.2 INSTRUCTIONAL MATERIALS FOR SELF-PACED COURSES

Most existing courses are presently designed as group-paced courses. When group-paced courses are redesigned to be self-paced, it is necessary to re-orient the written subject-matter content of the course from the instructor-oriented Lesson Topic Guides to the student-oriented Instructional Modules. Instructional materials prepared for self-paced courses are primarily designed for student use. The subject-matter content of the course is incorporated into Instructional Modules and presented in a variety of forms (multi-media presentation) for use by the student on an individual basis. A Learning Supervisor's Guide and a Student's Guide are prepared to provide learning supervisor and student orientation to the self-paced learning situation, and to provide learning supervisor guidance for planning student remediation in the self-paced course as required.

5.2.1 INSTRUCTIONAL MODULES

An Instructional Module is a logical grouping of Lesson Topics designed to achieve, wholly or in part, one or more Course Terminal Objectives. Enabling Objectives for this (these) Terminal Objective will be achieved through the Lesson Topics within the Module. The Instructional Module may be compared to the Unit of Instruction in the group-paced course. Lesson Topics and associated materials which comprise an Instructional Module will normally be bound into a Module Booklet form for student usability. The Module Booklet shall consist of the elements listed below:

5.2.1.1 Module Cover Page. Included on the Module Cover Page (Figure 3-56):

1. Security Classification (if classified, if not--"For Official Use Only")
2. Training Agency for which the Module is being prepared
3. Catalog of Navy Training Courses (CANTRAC) Number
4. Module (Number)
5. Complete Module Title
6. Training Activity preparing the Module
7. Date

5.2.1.2 Module Overview. The Module Overview, (Figure 3-57), shall contain a minimum of the following elements: A list of Lesson Topics with average completion times for each totaled to show the average completion time for the Module.

(Security Classification If Classified)
(If Not - "For Official Use Only")

PREPARED FOR
(COMPLETE COURSE TITLE)

(CANTRAC NUMBER)

MODULE (NUMBER)
(COMPLETE MODULE TITLE)

PREPARED BY
(TRAINING ACTIVITY PREPARING THE MODULE)

DATE

FIGURE 3-56 MODULE COVER PAGE FORMAT

(FULL COURSE TITLE)

MODULE (NUMBER)

(FULL MODULE TITLE)

In the Module - - - - - (Brief Introductory Paragraph)

List Lesson Topics included in Module:

Lesson Topic 1. (Title) - - - - - Avg. Time (Contact Hrs/Min)

Lesson Topic 2. (Title) - - - - - Avg. Time (Contact Hrs/Min)

etc. - - - - -

Module Avg. Time (Total) (Contact Hours/Min)

(Insert any general instructions to student concerning the use of this Module Booklet and any supporting materials)

FIGURE 3-57 MODULE OVERVIEW FORMAT

5.2.1.3 Lesson Topics. The remaining portion of the Module Booklet consists of the presentation of the Lesson Topics which make up the Instructional Module, sequenced in the order in which they are to be presented to the student. Each Lesson Topic shall contain a Cover Page and a minimum of the following elements as appropriate:

5.2.1.3.1 Lesson Topic Cover Page (Figure 3-59):

1. Full Course Title
2. Suitable Art Work if Desired
3. Module Number
4. Lesson Topic Number
5. Full Lesson Topic Title
6. Date

5.2.1.3.2 An overview of the Lesson Topic listing the Learning Objectives of the Lesson Topic is provided in accordance with Figure 3-60.

5.2.1.3.3 A List of Study Resources (Figure 3-61) that are available (and where located) for use by the student to achieve the Learning Objectives of the Lesson Topic is provided. This list shall include those study resources that are located in the Module Booklet and those located elsewhere in the Learning Center.

5.2.1.3.3.1 Study Resources that are contained in the Module Booklet include three standard written forms of the subject-matter content of the Lesson Topic: Lesson Topic Summary; Programmed Instruction form of Lesson Topic; and Narrative form of Lesson Topic. It is understood that each written form is to be designed to cover, to varying degrees, all the Learning Objectives of the Lesson Topic. The forms are parallel and are to represent multi-media written forms of the Lesson Topic. The Programmed Instruction and Narrative forms are to be capable of standing alone as alternate forms of the Lesson Topic presentation. The Lesson Topic Summary is a condensation of the Narrative form and may be used alone by students who have had previous knowledge/experience in the subject-matter area of the Lesson Topic. The Lesson Topic Summary is also suitable for summarization/review by all students as appropriate. A Lesson Topic Progress Check (Self-Test) for each Lesson Topic to be used by the student in measuring his achievement of the Lesson Topic Learning Objectives may also be included in the Module Booklet. The Lesson Topic Progress Check may be placed at the end of the Narrative form, or third form of Lesson Topic presentation included for each Lesson Topic in the Module Booklet. Answers to Progress Check test items are provided at the end of the Module Booklet or in a separate folder for use by the student in scoring his own Progress Checks. Add reference pages, numbers, frames, (Figure 3-66), etc. At the end of the three written forms of Lesson Topic presentation, a statement advises the student that he may proceed to the Progress Check if, based on his own judgment, he is ready to do so. This statement further states that when the student can answer all questions in the Progress Check he will go to the next Lesson Topic, etc., until he completes the entire Module. When the student has completed the Module, he is directed by a statement in the Module Booklet to go to his Learning Supervisor and ask to take the Module Test.

R

A

(FULL COURSE TITLE)

(SUITABLE ART WORK IF DESIRED)

MODULE (NUMBER)

LESSON TOPIC (NUMBER)

(FULL LESSON TOPIC TITLE)

DATE

FIGURE 3-59 LESSON TOPIC COVER PAGE FORMAT

OVERVIEW

LESSON TOPIC (NUMBER)

(FULL LESSON TOPIC TITLE)

In This Lesson Topic - - - - - (Brief Introductory Paragraph)

The Learning Objectives of this Lesson Topic are as follows:

1. (State Lesson Topic Objectives in full Behavior, Conditions, Standard(s))
2. (Etc.)

(These Learning Objectives must correspond to Enabling Objectives (possibly, in some instances, Terminal Objectives achieved in part by a Lesson Topic) listed on Curriculum Outline for Lesson Topic Breakdown)

(Statement to the student, directing him to review the "List of Study Resources" and read the Lesson Topic Learning Objectives before beginning the Lesson Topic.) A

FIGURE 3-60 LESSON TOPIC OVERVIEW FORMAT

LIST OF STUDY RESOURCES

LESSON TOPIC (NUMBER)

(FULL LESSON TOPIC TITLE)

To learn the material in this Lesson Topic, you have the option of choosing, according to your experience and preferences, any, or all, of the following study resources:

Written Lesson Topic presentations in Module Booklet:

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1. Lesson Topic Summary
2. Programmed Instruction Form of Lesson Topic
- *3. Narrative Form of Lesson Topic
*Duplicative Form of Narrative on Audio Cassette Tape may be provided.
- **4. Lesson Topic Progress Check

Additional Materials:

R

1. Audio/Visual Materials (As applicable)
2. Job Program Materials for Lab/Shop activities (As applicable)
3. Student Response Sheets (As applicable)
 - a. Information Sheets
 - ** b. Assignment Sheets
 - ** c. Job (Data) Sheets
 - d. Diagram/Formula/Schematic Sheets
 - e. Programmed Instruction Response Sheets
 - f. Answer Sheet for use with all tests
 - g. Notetaking Sheets

Enrichment Materials: (References)

A

(Statement to the student to let him know he may use any, or all, resources listed above, including the Learning Supervisor; but all materials listed are not necessarily required to achieve Lesson Topic Learning Objectives. The Progress Check may be taken at any time.)

- ** Progress Self-Checks, Job Sheets, and Assignment Sheets should be separate from Module and Lesson Topic Material in courses with large student inputs.

FIGURE 3-61 LIST OF STUDY RESOURCES FORMAT

5.2.1.3.3.1.1 The Lesson Topic Summary (Figure 3-63) is in written narrative form, but is a condensation of the Narrative form of the Lesson Topic. It covers the Lesson Topic Learning Objectives, but does not provide the detailed information found in the Narrative form or the Programmed Instruction form, and does not make provisions for student response.

5.2.1.3.3.1.2 The Programmed Instruction form of the Lesson Topic (Figure 3-64) is designed in accordance with approved standards for Programmed Instruction development by personnel who are graduates of an approved Navy Programmed Instruction Writer's Course such as the Instructional Programmers Course, Class C (C-570-2010), or Programmed Instruction Techniques/OSCAR/ (A-570-0014, 0015, 0016). Programmed Instruction writers will develop the Programmed Instruction form of the Lesson Topic in accordance with the Learning Objectives of the Lesson Topic which have been derived through the Task Analysis Processes conducted prior to the completion of the Curriculum Outline for the course.

5.2.1.3.3.1.3 Narrative form of Lesson Topic. The Lesson Topic Learning Objectives which are to be achieved by the student are stated in the overview of the Lesson Topic. The Narrative form of the Lesson Topic (Figure 3-65) is written in textbook format in sufficient detail to provide the student with the subject-matter content and student activities to achieve the Lesson Topic Learning Objectives. The Narrative form may contain provisions for student response, but not to the extent or frequency of student responses found in the Programmed Instruction form of the Lesson Topic.

5.2.1.3.3.1.4 Lesson Topic Progress Check. The Lesson Topic Progress Check (Figure 3-66) is designed as a self-test for the student. All Lesson Topic Learning Objectives must be criterion-tested by the Progress Check and multiple-choice, matching, and constructed response (fill in blanks) test items may be used for knowledge-type learning objectives. Skill-type learning objectives included in a Lesson Topic must be tested by some form of performance activity, and may, or may not, be suitable for self-scoring by the student. Answer keys for all Lesson Topic Progress checks included in an Instructional Module are placed together at the back of the Module Booklet to be used for self-scoring by the student. Since results of Progress Checks are immediately available to the student, he can plan his own remediation at the Lesson Topic level. This may involve repeating the Lesson Topic presentation medium already used (or portions thereof), using one of the alternate media of Lesson Topic presentation, or the student may seek assistance from a Learning Supervisor. In any case, the student determines when he has achieved all the Learning Objectives of the Lesson Topic, and when he will proceed to the next Lesson Topic.

5.2.1.3.3.2 Audio-Visual Instructional Materials. In addition to the three standard, written forms (media) of presentation of the subject-matter content of the Lesson Topic which are contained in the Module Booklet, when it has been determined to be feasible and instructionally sound to do so, an audio/visual presentation of the whole, or a part, of the Lesson Topic may be developed

MODULE (NUMBER)
LESSON TOPIC (NUMBER)

LESSON TOPIC SUMMARY

(LESSON TOPIC TITLE)

(CONDENSATION OF NARRATIVE FORM OF LESSON TOPIC)

Statement to Student: "At this point, you may take the Lesson Topic Progress Check. If you answer all self-test items correctly, proceed to the next Lesson Topic. If you incorrectly answer only a few of the Progress Check Questions, the Correct Answer page will refer you to the appropriate pages, paragraphs, or frames so that you can restudy the parts of this lesson topic you are having difficulty with. If you feel that you have failed to understand all, or most, of the lesson topic, select and use another medium of instruction: Narrative, Audio/visual Materials (if applicable), or consultation with Learning Supervisor, until you can answer all self-test items on the Progress Check correctly."

FIGURE 3-63 LESSON TOPIC SUMMARY FORMAT

PROGRAMMED INSTRUCTION FORM OF

LESSON TOPIC

(LESSON TOPIC TITLE)

(PI will be developed in accordance with approved procedures; may be linear or branching; may make provision for interspersed test frames for acceleration; will in all cases cover all Lesson Topic Learning Objectives and provide Criterion Test items in the Progress Check which measure achievement of Lesson Topic Learning Objectives. The PI form, like the Narrative form is designed to cover all Lesson Topic Learning Objectives and can stand alone as one form of Lesson Topic presentation.)

Statement to Student: "At this point, you may take the Lesson Topic Progress Check. If you answer all self-test items correctly, proceed to the next Lesson Topic. If you incorrectly answer only a few of the Progress Check Questions, the Correct Answer page will refer you to the appropriate pages, paragraphs, or frames so that you can restudy the parts of this lesson topic you are having difficulty with. If you feel that you have failed to understand all, or most, of the lesson topic, select and use another medium of instruction: Narrative, Audio/visual Materials (if applicable), or consultation with Learning Supervisor, until you can answer all self-test items on the Progress Check correctly."

FIGURE 3-64 PROGRAMMED INSTRUCTION FORM OF LESSON TOPIC FORMAT

NARRATIVE FORM OF LESSON TOPIC
(LESSON TOPIC TITLE)

(NARRATIVE form of Lesson Topic is written in textbook form in sufficient detail to provide coverage of Lesson Topic Learning Objectives. The NARRATIVE form may include low density student response provision --- similar to an adjunct program. The student responses may be "Matching," "Multiple-choice" or "Constructed Response" (fill-in blanks) types. In any case, the Narrative form will cover all Lesson Topic Learning Objectives and, like the Programmed Instruction form, is capable of standing alone when followed by the Progress Check for measurement of student achievement.)

Statement to the Student: "At this point, you may take the Progress Check. If you answer all self-test items correctly, proceed to the next Lesson Topic. If not, select and use another medium of instruction for the Learning Topic. This may involve discussion with the Learning Supervisor before proceeding to the next Lesson Topic, or before requesting the Module Test if the last Lesson Topic in the Module has been completed. If you incorrectly answer only a few of the Progress Check Questions, the Correct Answer page will refer you to the appropriate pages, paragraphs, or frames so that you can restudy the parts of this lesson topic you are having difficulty with. If you feel that you have failed to understand all or most of the lesson topic, select and use another medium of instruction."

(NOTE: It may become advantageous to provide verbatim cassette tapes of the Narratives (and Summaries) for student use without, or in conjunction with, the written narratives if the student either has a reading problem or responds better to an aural stimulus.)

FIGURE 3-65. NARRATIVE FORM OF LESSON TOPIC FORMAT

LESSON TOPIC PROGRESS CHECK

(LESSON TOPIC TITLE)

Lesson Topic Learning Objectives (If Learning Objective is skill-type, it must be tested by some kind of performance activity)

- 1.
- 2.
3. etc.

Progress Check (Self-Test)

1. Self-test items
2. Minimum of one item for each Learning Objective
3. May be matching, multiple-choice, or constructed response (Filling in Blanks).
4. - - - - -

The student may self-score Progress Check from Answer Keys in back of Module Booklet. Progress Check items will be paralleled to criterion test items. The format for reference pages, paragraphs, and frames is illustrated below:

<u>QUESTION NO.</u>	<u>CORRECT ANSWER</u>	<u>REFERENCE PAGES</u>	
		<u>Narrative Ref. Pages</u>	<u>PI Ref. Frames</u>
1	3	32,33	28,29
2	Induction	41	36
3a	1	16	12
b	6	15	11
c	2	20	18

FIGURE 3-66 LESSON TOPIC PROGRESS CHECK FORMAT

as an additional study resource. CNTECHTRA considers audio/visual instructional materials to be very effective media for achieving Learning Objectives in some subject-matter areas, particularly in self-paced courses. Under no circumstances, however, should this be construed to mean that a requirement should exist for an audio/visual presentation of every Lesson Topic in a course. Careful consideration must be made of the Lesson Topic Learning Objectives and the subject-matter content to determine feasibility/advisability of developing audio/visual media for the Lesson Topic. Even after a decision has been made to develop audio/visual materials for a particular Lesson Topic, the Learning Objectives should not be over-killed by utilizing more sophisticated (and more expensive) audio/visual devices/equipment/materials than are actually required to achieve the Learning Objectives. It is for this reason that the following guidelines will be used when requesting audio/visual equipment required to implement audio/visual software materials planned/developed:

REQUIREMENT

EQUIPMENT

Motion not required to achieve Learning Objective

Sound/slide presentation

Motion required but can be effectively isolated from the program sequence

Sound/slide plus Super 8 motion picture presentation

Motion required and must be interspersed within the program to achieve Learning Objectives effectively

Static/motion presentation

Sound only required for audio presentation of Narrative form of Lesson Topic

Audio Cassette Player designed for individual (earphone) reception

Training activities must anticipate audio/visual equipment requirements in accordance with policy guidelines contained herein for the implementation of individualized learning systems (self-paced courses). Requests for initial outfitting of audio/visual equipment shall be submitted to CNTECHTRA, stating justification/requirements to include but not be limited to the following:

1. Learning Objectives to be supported by audio/visual equipment
2. Types (Sound/slide, static/motion, film, sound)
3. Numbers required
4. Size, type (study or audio/visual), and number of carrels required
5. Software requirements

CNTECHTRA will verify and endorse Learning Objectives to be achieved by audio/visual equipments and submit requirements for this equipment to CNETS, copy to CNET, authorizing direct liaison with requesting CNTECHTRA activities and cognizant CNTECHTRA TPC's in order to determine the best audio/visual equipment to support the specified Learning Objectives. Hardware and software cost information will be determined through liaison with CNETS. Upon final determination of audio/visual requirements, CNTECHTRA will forward equipment list with cost information to CNET recommending procurement.

5.2.1.3.3.3 Job Program Materials for Laboratory/Shop Activities. Based on the premise that Navy Training must be job-relevant and that Navy jobs, duties, tasks, and task elements involve both knowledge and skills, Navy Training courses must incorporate liberal quantities of laboratory/shop activities to simulate on-the-job shop situations to provide students with "hands-on" training which will develop those skills identified as behavior actions in certain Lesson Topic Learning Objectives. Laboratory/Shop activities in group-paced courses have approached the self-paced learning concept as the student-to-equipment/device ratio approached a one-to-one ratio. Lesson Topics in Instructional Modules whose Learning Objectives involve the achievement of skills will include appropriate laboratory/shop activities to be performed by the student on an individual basis or, in some instances, as a member of a team group. Job program materials will be developed to provide necessary guidance to the student in the performance of these activities. They must be directly related to those Lesson Topic Learning Objectives that are skill-oriented and provisions must be made for measuring student achievement of these skill-oriented Learning Objectives through the use of check-points in the lab/shop activity procedures, self-test items to measure understanding of procedures, and Performance Tests. The Job Program is comparable to, but may contain more explanation and procedural detail than, the Job Sheet which may normally be a part of the Student's Guide for a group-paced course. The content of the Job Program will include the following (Figure 3-69):

1. Introduction. Consists of a brief statement of the purpose, scope, and value of the Lab/Shop activity to be performed.
2. Skill-oriented Lesson Topic Learning Objectives (Listed).
3. References. Complete list of all publications referenced in the procedural steps of the Job Program.
4. Equipment and Materials. Contains a listing of all equipment, tools, and materials necessary for the performance of the steps in the Job Program.
5. Procedural Steps in Job Program. Provide detailed procedures for performing assigned tasks on the system/equipment within a specified time. For the most part, steps in the Job Program will be self-explanatory, with directions to the student to have progress checked at stated intervals by the Lab/Shop Learning Supervisor. The activities through which each student develops the skills contained in the skill-oriented Learning Objectives are mandatory.

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5.2.1.3.3.4 Student Response Sheets. Student Response Sheets for a self-paced course will not be radically different from those used in a group-paced course. (See Section 5.1.2.2.2.1). These response sheets will include variations of assignment sheets, job sheets to be used with Job Programs, diagram or formula sheets, note-taking sheets, and will also include answer sheets to be used with Pre-Tests, Module Tests, and Post-Tests. Some test answer sheets are chemically treated to provide instant student feedback. Programmed Instruction response sheets will be provided for use with the Programmed Instruction form of the Lesson Topic, and with any other special Programmed Instruction materials that may be used for either diagnostic or remedial purposes. Information Sheets may be used in certain instances and retained by the student, but most Information Sheets will not require an immediate response from the student. A representative list of Student Response Sheets used in a self-paced course includes:

1. Assignment Sheets

JOB PROGRAM FOR LESSON TOPIC

(LESSON TOPIC TITLE)

Job Program is designed for use by student in Lab/Shop Activities.

List Lesson Topic Skill-Type Learning Objectives to be achieved by Student in Lab/Shop Activities.

Format for Job Plan will include:

1. Introduction: Brief Statement of Purpose, Scope, Value of Lab/Shop Activity.
2. References: Required for Lab/Shop Activity such as Tech Pubs, etc.
3. Equipment and Materials: Test Equipment, tools, reusable materials, expendable materials; where located, and how obtained and checked-in at the end of activity.
4. Procedural steps in Lab/Shop Activity to be performed: Sequenced as intended for optimum performance; providing intermediate check points for approval/check-off by Lab/Shop Learning Supervisor.

(NOTE: All performance tests must be successfully completed by all students.)

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FIGURE 3-69 JOB PROGRAM FOR LESSON TOPIC FORMAT

2. Job Sheets and Data Sheets to be used with Job Programs
3. Diagram (or Formula) Sheets -- may include block diagrams, schematics, charts, etc.
4. Answer Sheets for Progress Checks, Module Tests, Pre-Tests, Post-Tests, Special Tests (may include chemically treated answer sheets)
NOTE: Programmed Instruction Response Sheets will be provided if PI booklets are to be reusable.
5. Information Sheets (as required)
6. Enrichment Programmed Instruction booklets (as required)

5.2.1.3.3.5 Enrichment Materials. In addition to the Module Booklet, audio/visual materials, Job Programs for lab/shop activities, and various Student Response Sheets, other reference materials that are course-related are made available to the student in the Learning Center environment. These enrichment materials will include such things as textbooks and various Navy technical publications. They are placed in an accessible location in the Learning Center and the student is instructed to make use of them according to his own individual needs. It should be reemphasized that the Learning Supervisor is a valuable enrichment source and a reference to which the student is encouraged to go for assistance as required.

5.2.2 LEARNING SUPERVISOR'S GUIDE

The Learning Supervisor's Guide is a document to provide procedural guidance for conducting a self-paced course. It is composed of Front Matter, Descriptions of the Roles, Functions, Duties and Responsibilities of the Learning Supervisor, and Learning Supervisor Remediation Guides arranged by Module and Lesson Topic to supply assistance to the Learning Supervisor in determining/providing remediation to the student.

5.2.2.1 Elements of the Learning Supervisor's Guide. The Learning Supervisor's Guide defines the roles/functions, duties and responsibilities of Learning Supervisors for conducting self-paced courses and provides them with Remediation Guides for determining/providing student remediation in the course. The Learning Supervisor's Guide shall be prepared as prescribed herein when a course is designed/redesigned in the self-paced instructional strategy. The Remediation Guides shall be retained in the Learning Supervisor's Guide and kept current even if the course is converted to CMI operation. These Remediation Guides will form the basis for computer coding/programming for CMI operation and they represent a significant link in the chain that forms the Course Audit Trail to be used to justify course revision/update required by necessary changes in the Curriculum Outline.

5.2.2.1.1 Front Matter. The Front Matter of the Learning Supervisor's Guide shall consist of the following:

5.2.2.1.1.1 Cover Page. Included on the cover page (Figure 3-72):

1. Security Classification (if classified, if not --- "For Official Use Only")
2. "Instructor's Guide for ----" (Complete Course Title)
3. Catalog of Navy Training Courses (CANTRAC) number
4. Training Activity preparing the Learning Supervisor's Guide
5. Training Agency for which the Learning Supervisor's Guide is being prepared.
6. Date

5.2.2.1.1.2 Foreword Page. The Foreword Page is a statement of the purpose and interpretation of the contents of the Learning Supervisor's Guide. A Foreword Page will be submitted by the preparing activity as part of the Learning Supervisor's Guide. The Course Development Manager, upon approval of the Learning Supervisor's Guide, will supply a Letter of Promulgation.

5.2.2.1.1.3 Table of Contents (Figure 3-73).

5.2.2.1.1.4 Safety Notice. The Safety Notice shall be tailored to meet specific requirements of Learning Supervisors in a particular course.

5.2.2.1.1.5 How to Use The Learning Supervisor's Guide (Figure 3-74).

5.2.2.1.2 The Learning Supervisor. In the group-paced instructional environment, the instructor assumes the responsibility for presenting subject-matter content of the course to the student --- instructing is his role/function and he is therefore called "Instructor". In the self-paced learning environment, the responsibility for receiving and accepting the subject-matter content of the course is assumed by the student as a learner. Rather than being instructed by an instructor as in the group-paced situation, the student's learning must be supervised by someone fully knowledgeable of all aspects of the self-paced course. This "supervisor" --- vice "instructor" --- now assumes the role/function of a learning supervisor, and in all references to him as he functions in the self-paced learning environment, he will be called a Learning Supervisor and it is for his use that this Learning Supervisor's Guide is designed.

5.2.2.1.2.1 The Role of the Learning Supervisor is to direct an individualized, self-paced, instructional program (course) and supervise the achievement and progress of students in this course. The course has been designed to provide all the resources necessary for the student to achieve the Learning Objectives of the course on an individual, self-paced basis. Remediation is received by the student as required, as he progresses through the course. In a Computer Managed (CMI) Course, the Learning Supervisor provides tutoring and academic counseling on an individual basis when the student is assigned an "instructor input" by the computer.

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5.2.2.1.2.2 The Learning Center. The "classroom" in a self-paced course environment is the Learning Center. Learning Centers may be variously configured and sized, but the typical Learning Center will normally contain the functional areas shown in Figure 3-75.

(Security Classification If Classified)
If Not - "For Official Use Only"

LEARNING SUPERVISOR'S GUIDE

FOR

(COMPLETE COURSE TITLE)

(CANTRAC NUMBER)

PREPARED BY

(TRAINING ACTIVITY PREPARING THE LEARNING SUPERVISOR'S GUIDE)

PREPARED FOR

(TRAINING AGENCY FOR WHICH THE LEARNING SUPERVISOR'S GUIDE IS BEING PREPARED)

DATE

FIGURE 3-72 LEARNING SUPERVISOR'S GUIDE COVER PAGE FORMAT

TABLE OF CONTENTS

FRONT MATTER

PAGE

Foreword

Table of Contents

Safety Notice

How to Use The Learning Supervisor's Guide

THE LEARNING SUPERVISOR

Role of the Learning Supervisor

The Learning Center

The Learning Supervisor's Functions

Duties and Responsibilities of Learning Supervisors

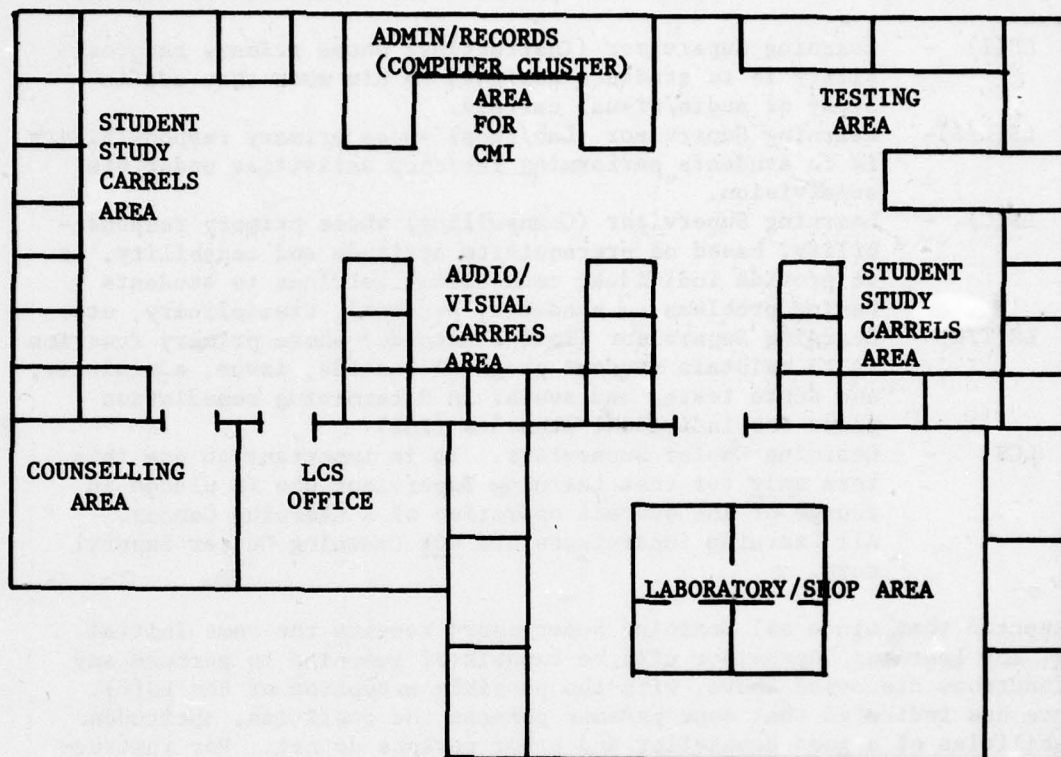
LEARNING SUPERVISOR GUIDES FOR STUDENT REMEDIATION

FIGURE 3-73 TABLE OF CONTENTS FORMAT

HOW TO USE THE LEARNING SUPERVISOR'S GUIDE

(This publication) has been prepared for your use while assigned duties as a Learning Supervisor for the _____ Course. Your initial training was provided by an Instructor Training Course that was designed to train both group-paced Instructors and self-paced Learning Supervisors. This Learning Supervisor's Guide is designed to supplement Instructor Training Course training, and any additional Learning Supervisor Training, by providing practical information for both new and experienced Learning Supervisors concerning role/function, duties and responsibilities in the individualized, self-paced learning environment. Additionally, the Learning Supervisor's Guide contains Remediation Guides for use by the Learning Supervisor to determine/prescribe remedial instruction for the student at both the Lesson and Module level.

FIGURE 3-74 HOW TO USE THE LEARNING SUPERVISOR'S GUIDE FORMAT



(NOTE: Spaces in addition to the Learning Center spaces will be provided for normal administrative functions, Curriculum Evaluation & Improvement (CE&I), etc.)

FIGURE 3-75 LEARNING CENTER

5.2.2.1.2.3 Learning Supervisor Functions. Learning Supervisors must perform functions that are classified as Instructing, Counselling, Laboratory/Shop Supervising, Testing/Record-keeping, and Learning Center Supervising. It follows that while all personnel performing these functions have received similar training prior to assignment to a specific self-paced course, and all are therefore Learning Supervisors, individual Learning Supervisors may perform any one (or more) of the above functions, and could be designated LS (Learning Supervisor) with an appropriate parenthetical indicator of function as follows:

1. LS(I) - Learning Supervisor (Instructing) whose primary responsibility is to students assigned to him when they are in study or audio/visual carrels.
2. LS(L/S)- Learning Supervisor (Lab/Shop) whose primary responsibility is to students performing lab/shop activities under his supervision.
3. LS(C) - Learning Supervisor (Counselling) whose primary responsibility, based on prerequisite aptitude and capability, is to provide individual counselling services to students having problems -- academic, personal, disciplinary, etc.
4. LS(T/R)- Learning Supervisor (Test & Records) whose primary function is to maintain student progress records, issue, administer, and score tests, and assist in determining remediation plans for individual students (IMI).
5. LCS - Learning Center Supervisor. It is important to use this term only for that Learning Supervisor who is placed in charge of the overall operation of a Learning Center. All Learning Supervisors are not Learning Center Supervisors.

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It is expected that since all Learning Supervisors receive the same initial training, any Learning Supervisor will be capable of learning to perform any of the functions discussed above, with the possible exception of the LS(C). Experience has indicated that some persons possess the qualities, aptitudes, and capabilities of a good counsellor and other persons do not. For instructors in group-paced courses who are converting to Learning Supervisors in self-paced courses the logical "bridge" between the two environments is in lab/shop activities and in situations where students are working with Programmed Instruction materials. The most experienced and most adaptable Learning Supervisor in a particular Learning Center will be designated as the Learning Center Supervisor (LCS).

5.2.2.1.2.4 Duties and Responsibilities of the Learning Supervisor Involved in Procedures for Conducting Self-paced Courses (IMI/CMI). Learning Supervisors are responsible for preparation for the student prior to his arrival and during his progress through the course. It is impossible to foresee all the problems that might arise with various learners (students). However, there are many things that will be common to most students. With this in mind, an outline of Learning Supervisor procedures (with certain accompanying representative duties/responsibilities) will be included in the Learning Supervisor's Guide. This outline should be tailored to the particular course and should include, but not necessarily be limited to, the following:

1. Preparation for Incoming Students.
 - a. Prepare carrel, supplying necessary hardware and software materials.

If certain students (or carrels) are specifically assigned to a particular Learning Supervisor, that Learning Supervisor's name should be posted in the carrel so that the incoming student will rapidly associate himself with the Learning Supervisor to which he is assigned.

- b. Complete administrative preparations and conduct enrollment procedures associated with the arrival of the student.
2. Provision for Student Orientation
 - a. Establish rapport with the student.
 - b. Orient the student into the individualized (self-paced) system of learning.
 - c. Instruct the student in the use of necessary materials.
3. Administration of the Instructional Activities Performed by the Student.
 - a. Completion of informational forms/questionnaires.
 - b. Completion of Pre-Tests: (as applicable) A
 - c. Use of Student's Guide.
 - d. Completion of Instructional Modules (Lesson Topics, Progress Checks, Enrichment Materials, etc.).
 - e. Completion of Module Tests.
 - f. Completion of Remedial Instruction as required.
 - g. Performance of Laboratory/Shop procedures.
 - h. Completion of Performance Tests.
 - i. Counselling activities.
4. Evaluation of The Student's Performance
 - a. Maintenance of close liaison with each student for whom responsible.
 - b. Observation, evaluation, and recommendations to the student concerning attitude, work habits, etc.
 - c. Direction, observation, and evaluation of lab/shop performance.
 - d. Maintenance of progress record of student's achievement (IMI). A
5. Measurement of student's achievement and provision for remediation as required.
 - a. Administration of tests; review and recording of results (IMI). A
 - b. Evaluation of student's achievement/progress and determination of the necessity to review/repeat weak or problem areas (IMI). A
 - c. Assistance for students with academic problems; recognition of presence of non-academic problems and arrangement for appropriate counselling.
 - d. Prescription and direction of Remedial Instruction; evaluation of results (IMI).

NOTE: The Learning Supervisor's Guide provides Guides for Remediation keyed to Lesson Topic and Module Learning Objectives; Remediation prescribed in Self-Paced courses operated under CMI is assigned and directed by the computer, appropriately interfaced with both the Learning Supervisor and Student.
6. Provision for Student Counselling
 - a. Determination of the type of counselling required by the student (academic, personal, disciplinary, etc.).
 - b. Learning Supervisor specializing in the counselling function, LS(C), provides counselling services for the individual student referred to him by the LS(I).
 - c. Maintenance of appropriate records of the counselling function for each student counselled.
 - d. Follow-up action indicated by the LS(C) will be the responsibility of the LS(I).

7. Conduction of Procedures Associated with Student Course Completion
 - a. Provision of inputs to and/or completion of records maintained on student progress.
 - b. Ensurance that students have turned in (returned) all materials and parts/equipment checked out.

5.2.2.1.3 Learning Supervisor Guides for Student Remediation. Based on the student's performance on a Module Test, a remediation plan (if required) will be prepared for him by the Learning Supervisor using the Guides for Student Remediation contained in the Learning Supervisor's Guide (IMI operation). The Module Test is composed of test items specifically designed to measure student achievement of the Learning Objectives of all Lesson Topics contained in the Module. The Module Test items, which are grouped on the test in accordance with the Lesson Topics contained in the Module, must be marked with a code number to identify them with the Learning Objective whose achievement the test items are designed to measure. Since each Learning Objective is tied directly to a Lesson Topic within a Module, the Module test item must have a three-part code number to identify it as follows: Part one of the code number will correspond to the Module number; the second part will identify the Lesson Topic number within the Module; and the third part of the code number represents the number of the Lesson Topic Learning Objective whose achievement the Module Test item is designed to measure. A Remediation Guide will be prepared for each Lesson Topic in each Module. The Remediation Guide shall have as a heading the applicable Module Title, Module Number, and Lesson Topic Number. Following the heading will be a numbered list of the Learning Objectives for the Lesson Topic. This numbered list shall follow the same order as that presented in the Module Booklet for that Lesson Topic. Numbers of Module Test items in the group designed to measure the Learning Objectives of the particular Lesson Topic for which the Remediation Guide is prepared are placed in a column on the left side of the Remediation Guide under a heading which corresponds to the particular form of the Module Test whose results are being remediated. Space is provided for indicating the numbers of corresponding test-items from alternate-form Module Tests for the same Module. Columns are then provided to indicate the number of the Lesson Topic Learning Objective from the list presented above for which each listed Module Test item is designed; types of testing situations included in the course to measure the indicated Learning Objective appropriately checked for each different Learning Objective; and a listing of all instructional materials (media), identified as to page number, frame number(s) for P.I., etc., contained in the course and applicable to the achievement by the student of the indicated Learning Objective. Space provided at the bottom of each Remediation Guide will permit the individual Learning Supervisor to add notes or otherwise personalize the guide for his own optimum use.

The Remediation Guide for a particular Lesson Topic will, therefore, provide the Learning Supervisor with the following information for his use in planning/prescribing a remedial instruction plan for the individual student based on incorrect responses to test-items on the Module Test:

1. Module Title
2. Module Number
3. Lesson Topic Number
4. Numbered List of Lesson Topic Learning Objectives

5. Numbers of Test-Items from each form of Module Test that are designed, as a group, to measure student achievement of Learning Objectives of particular Lesson Topic indicated; Test-Item numbers for groups from each form of Module Test placed in separate columns but parallelly arranged.
6. Number correlation of Module Test Items with Lesson Topic Learning Objectives
7. Indication of types of testing situations built into the course to test that particular Lesson Topic Learning Objective.
8. Listing of all available instructional materials (media) identified as to page number, frame number(s) for PI, test-item number on other testing media used to measure that Learning Objective

The information thus provided—one Remediation Guide for each Lesson Topic of each Module, in approved form/format—will permit more consistent remediation plans to be developed under IMI operation and will provide the basis for coding/programming the necessary information into a digital computer when a self-paced course is converted from IMI to CMI operation. The Learning Supervisor's Guides for Student Remediation, (Figure 3-80), shall be prepared and kept current, regardless of whether IMI or CMI Operation is utilized, because current Guides for Student Remediation will provide an important link in the chain that forms the Course Audit Trail for course design/redesign which is required to justify course revisions based on Curriculum Outline changes for whatever reason.

5.2.2.2 Review and Approval.

5.2.2.2.1 The Learning Supervisor's Guide is developed by the Course Development Manager as outlined herein.

5.2.2.2.2 The Course Development Manager will provide reproducible copies of the Learning Supervisor's Guide to Participating Training Activities.

5.2.3 THE STUDENT'S GUIDE FOR SELF-PACED COURSES

The Student's Guide for a self-paced course consists of Student Orientation to: the self-paced learning situation; Instructional Modules in Module Booklet form which provide the subject-matter content of the course in multi-media form for use by the student to achieve the Learning Objectives, both Terminal and Enabling, and the typical testing program for a self-paced course. The Student's Guide also provides the student with an overall Summary of the Course which he may retain for future reference.

5.2.3.1 Elements of the Student's Guide for Self-Paced Courses.

5.2.3.1.1 Front Matter. The Front Matter of the Student's Guide will consist of the following:

LEARNING OBJECTIVES FOR LESSON TOPIC NUMBER

1.
2.
etc.

LEARNING SUPERVISOR'S NOTES:

3-80

5.2.3.1.1.1 Cover Page. Included on the cover page (Figure 3-82):

1. Security Classification (If classified, if not---"For Official Use Only")
2. "Student's Guide for---" (Complete course title)
3. Catalog of Navy Training Courses (CANTRAC) Number
4. Training Activity preparing the Student's Guide
5. Training Agency for which the Student's Guide is being prepared
6. Date

5.2.3.1.1.2 Foreword Page. The Foreword is a statement of the purpose and interpretation of the contents of the Student's Guide. A Foreword Page will be submitted by the preparing activity as part of the Student's Guide. The Course Development Manager, upon approval of the Student's Guide, will supply a Letter of Promulgation.

5.2.3.1.1.3 Table of Contents. The Table of Contents, (Figure 3-83), shall include a listing of the major element headings contained in the Student's Guide with page numbers indicated.

5.2.3.1.1.4 List of Illustrations will be included in the Front Matter of the Student's Guide, if applicable.

5.2.3.1.1.5 Safety Notice. The Safety Notice to the Student shall be tailored to meet specific requirements of the course.

5.2.3.1.1.6 How to Use The Guide. The Student's Guide is designed for use by the student to gain insight into the concept of individualized learning in a self-paced learning environment using multi-media instructional materials. Designers of specific courses may include any additional instructions or explanations to the student that they determine to be of value to him as he progresses through the course. The Student's Summary provided as the final portion of the Student's Guide will allow the student to retain for future reference a statement of the Learning Objectives and a Summary of the subject-matter content of the self-paced course.

5.2.3.1.2 Instruction Sheets. The instruction sheets provide required information for the student to perform efficiently in a self-paced learning environment. A

5.2.3.1.3 Orientation. The Course Mission will be stated in the introductory portion of the Orientation Section of the Student's Guide. Additionally, the Terminal Objectives of the course will be listed under the Course Mission. The Orientation will then contain the following: R

5.2.3.1.3.1 What a Self-Paced Course Is. In many cases, the student beginning a Self-Paced course will be experiencing this kind of instruction for the first time. He will be told those things about a self-paced course that are different R

(Security Classification if Classified)
If Not - "For Official Use Only"

STUDENT'S GUIDE

FOR

(COMPLETE COURSE TITLE)

(CANTRAC NUMBER)

PREPARED BY

(TRAINING ACTIVITY PREPARING THE STUDENT'S GUIDE)

PREPARED FOR

(TRAINING AGENCY FOR WHICH THE STUDENT'S GUIDE IS BEING PREPARED)

DATE

FIGURE 3-82 STUDENT'S GUIDE COVER PAGE FORMAT

TABLE OF CONTENTS

FRONT MATTER	PAGE
Foreword	
Table of Contents	
List of Illustrations (if applicable)	
Safety Notice	
How to Use The Student's Guide	
Instruction Sheets	A
ORIENTATION	
What a Self-Paced Course Is	
What's Available and How To Use It	
The Testing Program	
STUDENT'S SUMMARY OF COURSE	R

FIGURE 3-83 TABLE OF CONTENTS FORMAT

from the group-paced courses he has previously attended. He will have a private carrel (enclosed desk) and perform as an individual, at his own rate, to achieve the Learning Objectives specified in the various Instructional Modules designed and provided for his use in the form of Module Booklets. He must read and understand these Learning Objectives prior to beginning his study of any Lesson Topic in any Module. The knowledges and/or skills to be learned in each Lesson Topic in the Modules are presented to the student in three standard written forms: Lesson Topic Summary; Programmed Instruction form of Lesson Topic; and Narrative form of Lesson Topic. Additional forms of presentation of the Lesson Topic material, such as sound, sound/slide, or 8mm movie film, and Job Programs for laboratory/shop activities, are provided for some Lesson Topics as applicable. The three standard written forms of the Lesson Topic are designed to cover, to varying degrees, all of the Learning Objectives of the Lesson Topic, and the student may choose the form best suited to his prerequisite training/experience and learning capabilities. In all cases, the student checks/tests himself on his achievement of the Learning Objectives of each Lesson Topic, using a Progress Check which is included in the Module Booklet at the end of each Lesson Topic. Results of the Lesson Topic Progress Checks are immediately available to the student, and he plans his own remediation at the Lesson Topic level. Remediation may involve repetition of the same medium of presentation, use of alternate media, or assistance from the Learning Supervisor. In any case, the student determines when he will progress to the next Lesson Topic. Module Tests are administered by the Learning Supervisor whenever the student decides for himself that he is ready to be tested on the entire Module. Failure to achieve Module Learning Objectives, indicated by Module Test performance, results in the assignment of Remedial Instruction of a prescribed form, followed by re-testing on those Module Learning Objectives the student failed to achieve. Orientation in the Student's Guide will normally include "pointers" that will be of value to the student in a self-paced learning environment. He must read all instructions carefully; ensure the achievement of all Lesson Topic Learning Objectives; use available learning resources wisely, including the Learning Supervisor who is also a valuable learning resource; and manage his time wisely. It will become evident to the student that ability to read is essential and that he must, at his own rate, achieve the Lesson Topic and Module Learning Objectives, and finally, successfully complete the course at his own optimum rate.

5.2.3.1.3.2 What's Available and How To Use It. The self-paced learning environment for the student normally includes a Learning Center (comparable to the group-paced classroom), equipped with study carrels to which students are assigned for individual learning activities; an area containing audio/visual carrels designed for student use of audio/visual instructional materials; a testing area; and a central administrative area where tests and records are processed. The Learning Center will also house various Enrichment Materials (References) which are made available to the student. In addition, the typical Learning Center should make available an area for Laboratory/Shop facilities which are designed to be consistent with the individually self-paced learning concept, and these facilities will be available to the student when he reaches a point in his learning sequence where lab/shop activities are indicated.

The concept of self-paced instruction does not imply a requirement to present instructional material in multi-media form. However, the use of multi-media Lesson Topic presentations has proven effective and the multi-media concept will be used in the design of Navy self-paced training courses. The orientation portion of the Student's Guide will provide a definition of the multi-media

concept and will indicate that the various forms of instructional materials provided for each Lesson Topic, written and audio/visual (where applicable) taken together, represent multi-media instructional materials. The student must know what materials are available for his use, where they are located and how he is to use them. The Instructional Module presented in Module Booklet form and discussed in detail in section 5.2.1 of this manual is designed for student use, and provides information to the student concerning what study resources are available and where they may be found. The Student's Guide will provide any additional instructions or explanations needed by the student that are not found in the Module Booklet concerning the use of available Instructional Materials (Study Resources). The Student's Guide will also instruct the student to exercise care in the use of audio/visual equipment and materials. He is not responsible for maintenance of such equipment, and is not to attempt even minor repairs of this equipment if a malfunction occurs. His responsibility is to inform his Learning Supervisor of any equipment problems.

5.2.3.1.3.3 The Testing Programs. It will be necessary in this section to present to the student an explanation of the forms and types of tests he will encounter in a self-paced course. Two forms of tests, knowledge tests and performance tests, are included in the Testing Program. The knowledge (written) tests include the following types: Course pre-test for diagnostic purposes, as applicable; Module tests to measure achievement of Module Learning Objectives; A and Course Post-Test to measure achievement of Course Learning Objectives or Terminal Objectives. In the development of particular self-paced courses, a requirement may be determined for additional knowledge tests. In some instances, special pre-tests, exercise sheets, and special programs may be required for learners who do not have certain necessary prerequisite knowledge/skills required for portions of the course. Performance tests are used with Job Programs for laboratory/shop activities. The written knowledge tests and performance tests constitute the Testing Program for a self-paced course. R

Although the Lesson Topic Progress Checks are student self-tests which provide immediate feedback to the student on his progress in the achievement of Lesson Topic Learning Objectives, conceptually they are not considered to be a part of the Testing Program.

All tests are used to determine whether or not the student has achieved stated Learning Objectives. Test results provide a valuable source of feedback to assist in determining the validity of Course Learning Objectives.

5.2.3.1.4 Student's Summary of a Self-Paced Course. Every Lesson Topic developed for the Modules of a self-paced course contains, as one of the standard written media, a Lesson Topic Summary. The Student's Guide will be retained by the student, and the final portion of the guide will consist of a complete set of these Lesson Topic Summaries, arranged sequentially by Lesson Topics and Modules. Each Lesson Topic Summary shall be prefaced by the Learning Objectives for the Lesson Topic. R

5.2.3.2 Review and Approval.

5.2.3.2.1 The Student's Guide will be developed by the Course Development Manager as outlined herein.

5.2.3.2.2 The Course Development Manager will provide reproducible copies of the Student's Guide to Participating Training Activities.

6.0 VALIDATION

Validation involves: ensuring that the course materials produce the desired results; determining if and where additions or deletions are required; adjusting and finalizing the sequence of instruction; and identifying the resources for implementing the course on an operational basis. The validation process which is to measure the effectiveness of the course is accomplished by coordinating all resources to achieve the Course Mission.

6.1 REVIEW PRIOR TO VALIDATION

The course material is not developed in its entirety and then validated. Each segment of the course is validated as it is being developed. The first rough-draft material is reviewed by all members of the course development team. This review is primarily to ensure technical accuracy, and gaps which can easily be determined by team members.

The course material will be submitted for review as it becomes available.

All materials must contain:

1. List of Learning Objectives.
2. Draft of the Proposed material.
3. Criterion Test items.

Questions the reviewers should ask as they evaluate the rough-draft materials are:

1. Is the content accurate?
2. Is the material sequenced in a logical order?
3. Does the lead-in information motivate the student to pursue the material?
4. Is the material written in such a manner to allow for maximum student participation?
5. Is there opportunity for review and practice?
6. How effectively does the material teach behaviors specified in the Learning Objectives?
7. Does the Criterion Test measure the behavior as specified in the Learning Objectives?

The reviewers must make careful notes. Suggestions or questions must cite specifically what is being commented on and its specific location, i.e., page 6, paragraph 2, sentence 3.

When the review has been completed, the course development team will discuss their findings and correct any discrepancies. The internal review does not determine validity of the course material. It does identify problem areas and suggest alternatives.

6.2 TARGET POPULATION

Before the validation process can be conducted, students representative of the target population must be selected for use in the "try out" of the course material. Students must be selected who fall within a specified range of Basic Battery Test Scores, possess prior knowledge and background of students typical of the particular course. If the sample does not meet specified conditions, the results will be biased, i.e., it will be impossible to generalize the performance of the sample to the target population.

The students selected for the first tryout should come from the upper level of the target population for the following reasons:

1. Upper-level students can often point out and analyze weak areas in the course material.
2. If the upper-level students can't achieve the Learning Objectives, the average and below average student cannot be expected to achieve them.

6.2.1 INITIAL TRYOUT

The initial validation tryout shall be conducted as follows. Two to five students of the target population shall take that portion of material on which they are to be evaluated by Criterion Testing. Regardless of the type of course material to be validated, the student will be provided Learning Objectives, material to be learned, and accompanying Criterion Test. Since self-paced materials normally provide multi-media presentations, the control groups should take all media in accordance with the guidelines stated above.

After revision, an additional group of two to five students shall take the revised material. This process is continued until the standards as stated in the Criterion Tests are achieved.

6.2.2 ADMINISTERING THE MATERIALS

Students will complete the materials in the presence of the course development team members during the initial tryouts. It will be explained to the students that they are not being evaluated, but that they, the students are helping to locate problem areas in the course material.

It is necessary to make sure the students are at ease and ensure that they understand that if they make errors or encounter difficulty it is no reflection on their ability.

6.2.3 SOURCES OF INFORMATION

1. Tests. Administer the part of the Criterion Pre-Test that covers the course material being validated to identify entering behavior. Administer the

Criterion Post-Test to assess learning achieved. The Post-Test will reveal errors and assist the course development team to identify flaws in the course material.

2. Student Performance. Observe and record the students' behavior as they work through each learning exercise or task. Obtain information about the specific areas which result in errors: the type of errors, and the number of students making what type of errors.

3. Student Comments. Obtain students' reaction about any difficulties encountered during the tryout. Ask students for suggestions on how to clarify the course material.

6.3 SMALL-GROUP TRYOUT

A small group tryout shall be conducted on a sample of the target population. Approximately six to ten students, representing an even distribution of low, average, and high aptitude students, shall compose this sample. Trying out course material with a group of representative students will serve to provide information concerning the validity of the course material in a simulated training situation. This procedure applies to both group-paced and self-paced courses to determine the efficiency of the course material. Make revisions as specified in the above sections and then try out the revised instruction on another group of six to ten students. Continue the small-group tryouts until a total of 20 to 30 representative students have tried out the course material.

6.3.1 TIME DATA

Time becomes a factor at this point of validation. It is not enough that students learn the course material, they must also complete it within a reasonable period of time. In some self-paced courses there are no limits placed on the length of time the students are allowed to achieve the Learning Objectives. From a practical point of view, however, this should not be the case. A Cumulative data must be recorded on terms of average, maximum, and minimum time. The length of time the students should take to achieve the D Learning Objectives should approximate the average completion time of the group. R

6.4 OPERATIONAL TRYOUT

Complete course Units/Modules are validated using approximately 30-50 students who represent the target population. The quantity of course material being validated will vary. Ideally, it should be a course in its entirety.

Reasons for conducting an operational tryout are:

1. Course materials must be evaluated as an integral part of the total system. Until now, individual and small-group tryouts validated portions of course material in an isolated environment.

2. Analysis of data from this larger sample will provide solid bases for final revision and refinement of the course. Data gathered at this point will provide feedback concerning the adequacy of the Training Task Analysis, Learning Objectives, Criterion Tests, and course materials. If students fail to meet the standards of the Terminal Objectives, reassessment of each of these procedures and products of the course design/development process shall be scrutinized.

3. An operational tryout provides an opportunity to work out administrative, equipment, facility, or any other implementation problems which may cause trouble later.

Once a course is validated and implemented operationally, the assumption cannot be made that the work is "all over". Problems involving Instructor and Learning Supervisor qualifications, equipment, maintenance, scheduling and wide variations in student's attitude, aptitude, and ability will always exist. Changes in Fleet requirements impose changes in Learning Objectives and the associated equipment and course materials. To be an effective, efficient course, course materials must be continuously evaluated and all revisions and changes must follow the Course Audit Trail.

6.5 USE OF DATA OBTAINED THROUGH CRITERION TESTING AS A PART OF VALIDATION

In addition to providing a valid measurement of student achievement, Criterion Testing used in the Validation process will provide data that can be utilized in diagnosing training problems and determining the validity of Course Learning Objectives.

6.5.1 RECORDING CRITERION TEST DATA

Information will be recorded for each Criterion Test administered during the validation process. This information will be used to identify strengths and weaknesses in the course, and to provide a basis for initiating corrective actions to improve the course. Criterion Tests provide measurement of student achievement of the Learning Objectives for a subject-matter area or areas of a course. The minimum information to be recorded on the Criterion Test Data Record for each Criterion Test administered is indicated in the format in Figure 3-90.

6.5.2 SUMMARIZING AND INTERPRETING CRITERION TEST RESULTS

When the Criterion Tests have been administered to a sufficient number of students, the recorded data is analyzed. Strong and weak areas of the course will be indicated by the percentage of students passing the Criterion Test. Since all testing is Criterion Testing, a low percentage of students passing a Criterion Test indicates course weakness in the area covered by that Criterion Test. The cause of the deficiency must be discovered and corrected.

TEST DATA RECORD

COURSE TITLE _____

COURSE NUMBER _____

TEST IDENTIFICATION _____

TEST SERIES _____

DATE TEST ADMINISTERED _____

CLASS NUMBER _____

NUMBER OF STUDENTS TESTED _____

PERCENTAGE PASSING TOTAL TEST _____

PERCENTAGE PASSING BY AREA _____

(TITLE OF 1ST SUBJECT MATTER AREA) _____

(TITLE OF 2ND SUBJECT MATTER AREA) _____

(_____) _____

(_____) _____

(_____) _____

(TITLE OF 6TH SUBJECT MATTER AREA) _____

TESTING LOCATION _____

TEST ADMINISTRATOR _____

FIGURE 3-90 CRITERION TEST DATA RECORD FORMAT

Further analysis is conducted to ensure that the test developer has not inadvertently incorporated features in the Criterion Test that produced the deficiency. The directions to the students taking the test may have been misleading or ambiguous. Possibly the conditions under which the test was administered, or the test design and response procedures may have contributed. If the Criterion Test itself checks out satisfactorily, the course materials presented immediately become suspect.

Analysis of the percentage of students passing each subject-matter area of a Criterion Test may reveal a weakness in a particular subject-matter area or a general weakness in many subject-matter areas.

6.5.3 DIAGNOSING TRAINING PROBLEMS

When a general weakness in many subject-matter areas is indicated the course materials or methods of presentation are probably at fault. Further analysis will reveal the areas within the course that require corrective action.

6.5.4 DETERMINING VALIDITY OF COURSE LEARNING OBJECTIVES

A high failure rate on a Criterion Test indicates that sufficient learning was not accomplished for student achievement of the Learning Objectives. Analysis of the course material will reveal whether or not the particular behavior can be learned and its achievement measured in the course. If it can be, it should be; if not, then the Learning Objective is not valid and must be changed to reflect necessary course material that can be learned and achievement measured.

SECTION 3 - DEFINITIONS

AUDIO/VISUAL MATERIALS - Instructional materials which are designed to present information through media that appeal strongest to the senses of hearing and seeing. Visual materials other than the printed word may be static or dynamic.

CANTRAC NUMBER - Numbers assigned to courses listed in the Catalog of Navy Training Courses.

CATALOG OF NAVY TRAINING (CANTRAC) - A NAVEDTRA Publication consisting of three volumes (w/Annex A), that provides information concerning courses conducted by NAVEDTRACOM.

COMPUTER MANAGED INSTRUCTION (CMI) - An instructional system which uses a computer to manage the students' use of a variety of learning resources available in the Learning Center. R

GROUP-PACED INSTRUCTION - Instruction developed in a sequence and timed to the progress of the majority of the class.

GUIDES FOR STUDENT REMEDIATION (IN LEARNING SUPERVISOR'S GUIDE) - A guide for each Lesson Topic in a self-paced course designed to provide the Learning Supervisor with assistance in planning/prescribing a remedial instruction plan for the individual student, based on incorrect responses to test-items on the Module Test.

INSTRUCTIONAL MODULES - A major sub-division of subject-matter content in a self-paced course; a logical grouping of Lesson Topics designed to achieve, wholly or in part, one or more course Terminal Objectives.

INSTRUCTIONAL STRATEGY - A system for presenting instructional materials designed to achieve Learning Objectives. Relative to CMI course development, included in this instructional strategy are techniques designed to optimize the assignment and sequencing of instructional software, and provide specifications of the detailed remediation procedures required for course coding. A

INSTRUCTOR MANAGED INSTRUCTION (IMI) - An instructional method which uses the Learning Supervisor ("Instructor") to manage the students' use of a variety of learning resources available in the Learning Center.

INSTRUCTOR'S GUIDE - A series of Lesson Topic Guides grouped in Units which collectively outline the teaching/learning activities to be accomplished in a group-paced course.

LEARNING SUPERVISOR'S GUIDE - A document which provides procedural guidance to the Learning Supervisor for conducting a self-paced course.

LESSON TOPIC GUIDE - An outline of instruction for a Lesson Topic in a group-paced course which provides all information necessary for the instructor to conduct the Lesson Topic. Lesson Topic Guides may be suitably annotated by individual instructors.

LESSON TOPIC PROGRESS CHECK - A criterion test to be used by the student in a self-paced course as a self-test to measure achievement of the Learning Objectives of the Lesson Topic.

MEDIA (MEDIUM) - The means through which information is made available to the student.

METHODS - The means, techniques, and procedures of instruction.

PASS/FAIL CRITERION (SCORE) - Criterion tests are scored on the basis of achievement (or lack of achievement) of Learning Objectives; therefore, no "grades" as such are given, and the test results are either Pass or Fail on a Learning Objective by Learning Objective basis.

POST/TESTS - Tests which measure the student's achievement of the Terminal Objectives of a course.

PRE-TESTS - Tests administered before training which provide information upon which to base decisions related to acceleration or remediation.

PROGRESS TESTS - Tests which are administered at various intervals during the course to measure student progress.

SELF-PACED INSTRUCTION - Instruction developed in a sequence and format that allows each student to progress at a rate that is commensurate with his ability. Multi-media presentations and/or varying levels of difficulty of instructional materials permit this type of instruction to be individualized.

R

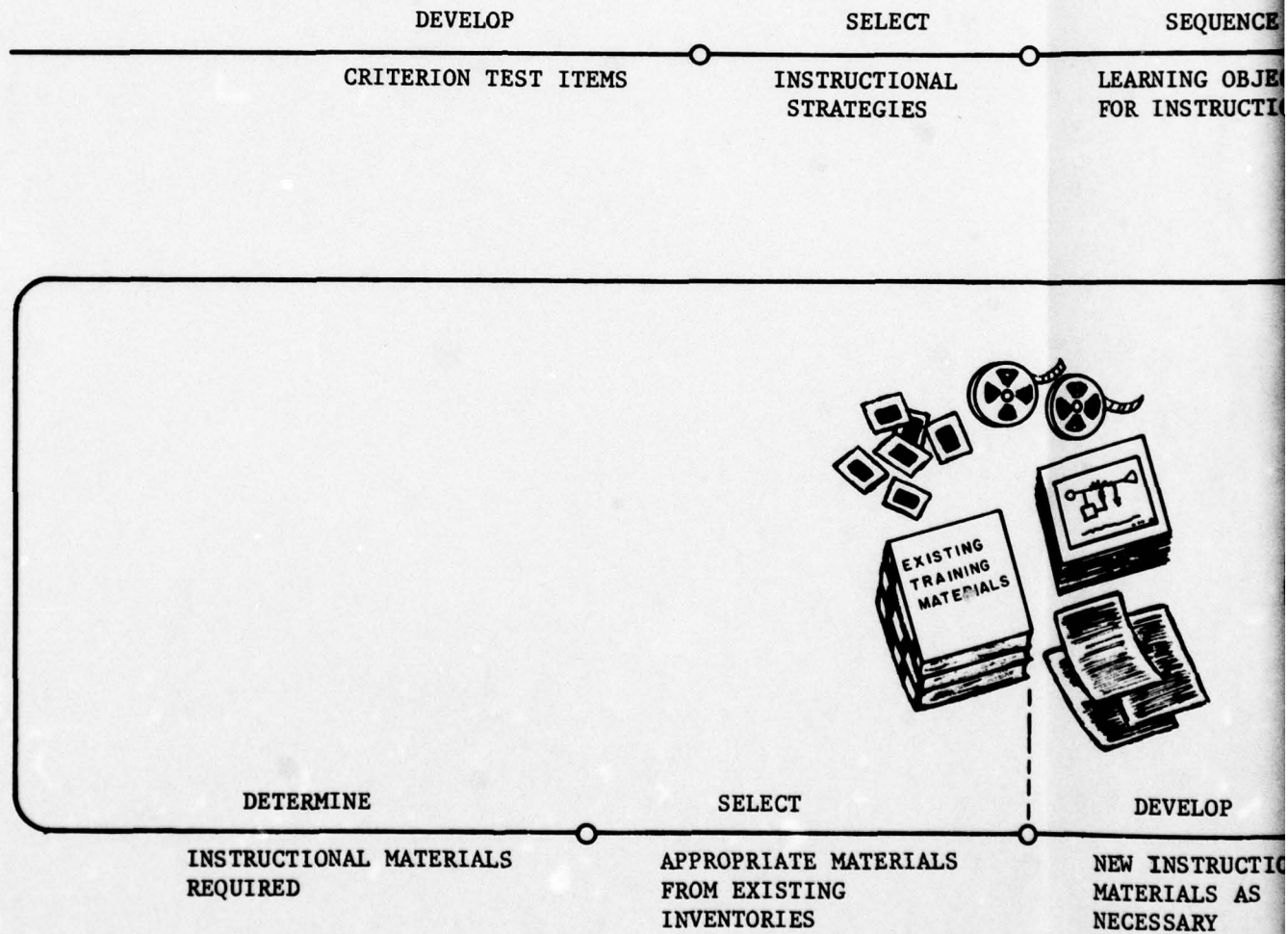
STUDENT'S GUIDE - A guide designed for use by, and for the benefit of, the student in a course; although some differences exist between the format and content of Student's Guides for group-paced and self-paced courses, both are intended to supply information and guidance to the student.

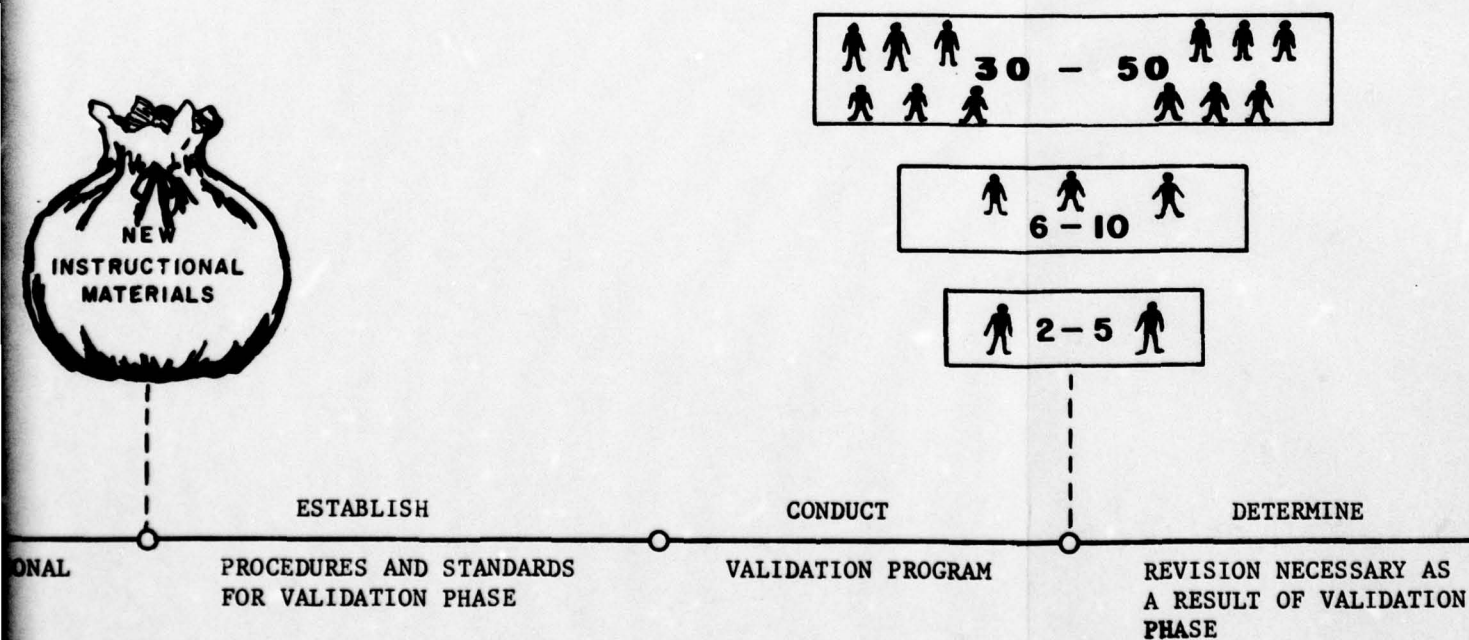
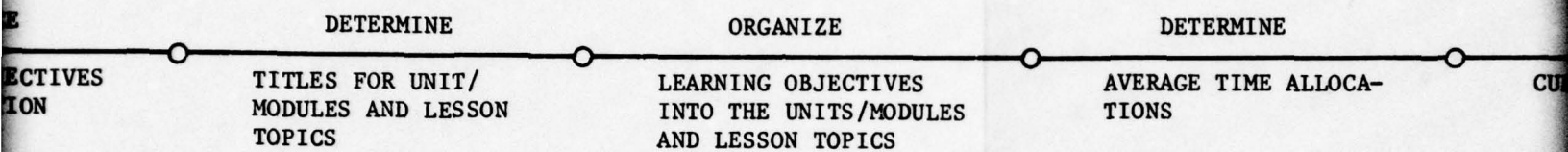
VALIDATION (INITIAL TRYOUT) - Two to five students of the target population take that portion of material on which they are to be evaluated by criterion testing.

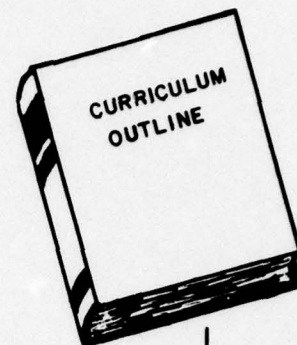
VALIDATION (SMALL-GROUP TRYOUT) - Approximately six to ten students of the target population representing an even distribution of low, average, and high aptitudes constitute the sample for this tryout.

VALIDATION (OPERATIONAL) - Complete instructional units/modules are validated using approximately 30-50 students who represent the target population.

COURSE DEVELOPMENT







ORGANIZE

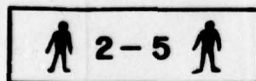
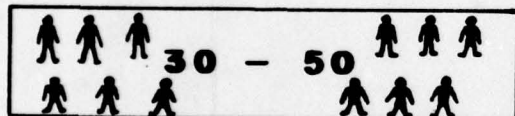
LEARNING OBJECTIVES
INTO THE UNITS/MODULES
AND LESSON TOPICS

DETERMINE

AVERAGE TIME ALLOCA-
TIONS

DEVELOP

CURRICULUM OUTLINE



CONDUCT

VALIDATION PROGRAM

DETERMINE

REVISION NECESSARY AS
A RESULT OF VALIDATION
PHASE

REVISE

AS NECESSARY

MANAGEMENT

There are many levels of management in the Navy Training organization. CNTECHTRA-sponsored courses are normally conducted in Navy Schools Commands. The management of a school is under the direction of a Training Officer or an equivalently titled officer. Administrative and supervisory personnel performing duties in the clerical, testing, counselling, quality assurance, curriculum improvement, training support and equipment maintenance areas, along with the instructors and/or learning supervisors complete the staff. It is recognized that activities conducting Navy Technical Training differ greatly in size and composition of training organizations. Procedures for the management of Navy Technical Training Courses presented in this manual are designed primarily for Navy Schools Commands and/or Naval Technical Training Centers. Modifications of these procedures for small activities will be approved by CNTECHTRA.

Training is conducted to prepare personnel for successful job performance upon assignment to billets in the operating forces. Naval Technical Training courses are planned, designed, developed and managed for this reason. The prime responsibility of Naval Technical Training course managers is to ensure that course graduates can perform successfully the jobs for which the training is provided in these courses.

CONTENTS

SECTION 4 - MANAGEMENT

Chapter 1.0 - Continuing Program of Evaluation

2.0 - Monitoring Student Progress

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Annex 4-1 Definitions

Annex 4-2 Audit Trail - Foldout (Management)

1.0 CONTINUING PROGRAM OF EVALUATION

Navy Technical Training Courses, after validation and implementation, must be continually evaluated both for currency/relevancy of subject-matter content (skills and knowledge factors) and for degree of success of course graduates at whatever point they may be in the training pipeline or on the job. Evaluation procedures applied to any training program must of necessity, therefore, be classified as internal and external evaluation procedures.

1.1 INTERNAL EVALUATION PROGRAM AND PROCEDURES

The stated purpose of Course Internal Evaluation is to determine that the elements of the course are current and are working effectively and efficiently to achieve the Learning Objectives. Internal evaluation of training is based on information obtained from within the school organization or course. Constant monitoring of student performance followed by constructive changes to correct deficiencies (but not without regard to the Course Audit Trail) will prevent mission failure through poor performance on the job by graduates of a training course.

The foundations of Course Internal Evaluation (hereinafter referred to as "Course Review") are assurance that:

1. Learning Objectives are based on Task Analysis.
2. Accurate and appropriate criterion measures are provided.
3. Effective use is made of student test data.
4. Efficient and effective supervisory support is provided.

An annual Course Review shall be conducted for all courses and this review must be planned and scheduled for the oncoming fiscal year by personnel of the course involved with consideration for all factors that may influence the outcome. Such factors as newness of course, time since last review, course evaluation projects underway, planned changes in instructional system elements, Task Analysis status, existing staff workload, etc., must be considered in Course Review scheduling to ensure that sufficient opportunity exists to adequately conduct/manage the Course Review.

1.1.1 COURSE REVIEW DATA

The basis for conducting a Course Review involves the completion of standardized checklists for use in examining each element of a course. The checklists provide for rating the review items on the following basis: Adequate (A), indicating necessary requirements are being met; Generally Adequate (GA), indicating minor attention/improvement needed; Inadequate (I), indicating major attention/improvement required; and Not Applicable (NA), indicating that this factor does not apply. It shall be noted, however, that no factor considered essential to the review of all courses, and marked with an asterisk, can be rated NA. Completion of these checklists by selected reviewers that are trained personnel who have extensive knowledge of the course and its

Learning Objectives; who have day-to-day contact with its various instructional elements; who have wide teaching experience in the course as well as recent fleet experience; and who, where possible, assisted in the course design/development will produce a good Course Review.

Checklists to be used in the Course Review, (Figure 4-3, Pages 1-15), are designed to evaluate the following course elements:

1.1.1.1 COURSE CONTROL DOCUMENTS

- Course Outline
- Curriculum Outline
- Catalog of Navy Training Courses (CANTRAC) Entry
- Course Audit Trail

1.1.1.2 TESTING

1.1.1.3 INSTRUCTIONAL STAFF

- Instructional Methods and Techniques
- Instructors/Learning Supervisors
- Supervisory Personnel

1.1.1.4 INSTRUCTIONAL MATERIALS

- Instructional Modules
- Instructor's Guide
- Learning Supervisor's Guide
- Student's Guide
- Training Aids/Devices; other audio-visual materials
- Additional Training Resources

1.1.1.5 COURSE PLANS AND DATA

1.1.2 UTILIZATION OF COURSE REVIEW DATA

Upon completion of a Course Review, qualified personnel within the school administering the course, shall review the completed checklists and provide a summary report to the Commanding Officer of the training activity involved. This report shall summarize findings, indicate recommended actions to be taken and other recommendations as required. For courses that are not single-sited and come under the Course Development Manager concept, Participating Training Activities shall forward their Course Review reports to the Course Development Manager who coordinates the recommendations for actions to be taken to revise/improve the course as a result of the findings of the Course Review and in accordance with the Course Audit Trail. It will be the responsibility of the Course Development Manager to resolve differences in action recommendations for course revision/improvement in the type B change category resulting from annual Course Reviews. Major discrepancies in type B changes between multi-sited courses which cannot be resolved to the satisfaction of

COURSE REVIEW CHECKLISTS
CNTECHTRA-GEN 1550/4

CHECKLIST 1 - COURSE CONTROL DOCUMENTS		
<u>Course Title</u>	<u>Course No.</u>	<u>Scheduled Review Date</u>
<p>INSTRUCTIONS: Review the checklist below. Determine the training adequacy for each review element and either assign one rating code per item or indicate yes/no as applicable. Include comments concerning any additional areas reviewed in the "remarks" section.</p>		
<p>RATING CODES: A - Adequate (Requirements being met) GA - Generally Adequate (Minor attention needed) I - Inadequate (Major attention needed) NA - Not applicable (Does not apply)</p>		
REVIEW ELEMENTS		RATING
1. Course Outline		*
a. On File		Yes/No *
b. Approved		Yes/No *
2. Curriculum Outline		*
a. On File		Yes/No *
b. Approved		Yes/No *
c. Front Matter		*
d. Learning Objectives clear and contain behavior, conditions, and standards.		- - - - - *
e. Sequence of Outline of Instruction		*
f. Training time allotted for each Unit/Module and Lesson Topic		- - - - - *
g. Annexes		*
3. Catalog of Navy Training Courses (CANTRAC) entry		*
a. Description current and accurate		Yes/No *

FIGURE 4-3, Page 1 CHECKLIST FORMAT

CHECKLIST 1		REMARKS	
<p>Explain each "inadequate" rating and indicate the corrective action already in progress, or recommend appropriate action.</p>			
<p>SUMMARY</p>			
DOCUMENT	ACTION DUE	RESPONSIBILITY FOR	ACTION
	DATE	ACTION	COMPLETED DATE
COURSE OUTLINE			
CURRICULUM OUTLINE			
CANTRAC COURSE ENTRY			
SIGNATURE OF REVIEWER	JOB TITLE		DATE REVIEW COMPLETED

FIGURE 4-3, Page 3

CHECKLIST 2 - TESTING		
<u>Course Title</u>	<u>Course No.</u>	<u>Scheduled Review Date</u>
INSTRUCTIONS: Review the checklist below. Determine the training adequacy for each review element and either assign one rating code per item or indicate Yes/No as applicable. Include comments concerning any additional areas reviewed in the "remarks" section.		
RATING CODES: A - Adequate (Requirements being met) GA - Generally Adequate (Minor attention needed) I - Inadequate (Major attention needed) NA - Not applicable (Does not apply)		
REVIEW ELEMENTS	RATING	
1. Criterion Testing is being conducted	Yes/No	*
2. Testing provides comprehensive coverage of the Learning Objectives.	- - -	
3. Alternate test series are of the same difficulty	Yes/No	*
4. Test Administrators are aware of current policies and follow current procedures	- - -	
5. Testing data is utilized to improve course		*
6. Test results are used to provide feedback to students		
7. Tests are administered under conditions ensuring equal student opportunity for success	- - -	
8. Time allotted for testing is	Yes/No	
9. Procedures to prevent test compromise are		
10. Procedures for test critiques are		
11. Procedures for updating and revision of tests in accordance with changes in learning objectives are		A
12. Procedures for student setback, continuation with class,	- - -	*

FIGURE 4-3, Page 4

CHANGE 1

CHECKLIST 2		REMARKS	
<p>Explain each "inadequate" rating and indicate the corrective action already in progress, or recommend appropriate action.</p>			
<p>SUMMARY</p>			
TESTING	ACTION DUE	RESPONSIBILITY FOR	ACTION
	DATE	ACTION	COMPLETED DATE
CRITERION TESTS			
SIGNATURE OF REVIEWER	JOB TITLE		DATE REVIEW COMPLETED

FIGURE 4-3, Page 6

CHECKLIST 3 - INSTRUCTIONAL STAFF	
Course Title	Scheduled Review Date
<p>COURSE NO.</p>	
<p>INSTRUCTIONS: Review the checklist below, determine the training adequacy for each review element and either assign one rating code per item or indicate Yes/No as applicable. Include comments concerning any additional areas reviewed in the "remarks" section.</p>	
<p>RATING CODES: A - Adequate (Requirements being met) GA - Generally Adequate (Minor attention needed) I - Inadequate (Major attention needed) NA - Not applicable (Does not apply)</p>	
REVIEW ELEMENTS	RATING
1. Instructional methods and techniques utilized:	
a. Correspond to selected instructional strategy for the	- - - - -
Course	Yes/No
b. Enhance student learning process	Yes/No
c. Assist in developing student self motivation	Yes/No
d. Provide for ample student/instructor/learning supervisor	- - - - -
interaction	
e. Provide activities beneficial to learning process	- - - - -
during "waiting" time	
2. Instructors/Learning Supervisors	
a. Teach IAW Instructor's Guide (Group-Paced)	
b. Are certified to teach in the course	
c. Are qualified to teach in the course	
d. Maintain proper control and discipline	
e. Are present in sufficient numbers to prevent accidents	- - - - -

FIGURE 4-3, Page 7

during potentially hazardous or dangerous situations	
f. Are available in sufficient numbers for student access	- - - -
and assistance	
g. Display job satisfaction	
3. Supervisory Personnel	
a. Ensure that instructors/learning supervisors are	- - - -
qualified before assignment to "teaching" in a course	
b. Conduct a valid "instructor achievement recognition	- - - -
program"	
c. Provide cross-training to produce multiple-assignment	- - - -
capability	
d. Provide adequate inservice training and guidance to	- - - -
instructors/learning supervisors on administrative matters	
e. Conduct classroom/laboratory observation and evaluation	- - - -
followed by conference with instructor/learning supervisor	

FIGURE 4-3, Page 8

CHECKLIST 3 - INSTRUCTIONAL STAFF

Explain each "inadequate" rating and indicate the corrective action already in progress, or recommend appropriate action.

SUMMARY

INSTRUCTIONAL STAFF	ACTION DUE DATE	RESPONSIBILITY FOR ACTION	ACTION COMPLETED DATE
INSTRUCTIONAL METHODS AND TECHNIQUES			
INSTRUCTORS			
SUPERVISORY PERSONNEL			
SIGNATURE OF REVIEWER	JOB TITLE		DATE REVIEW COMPLETED

FIGURE 4-3, Page 9

CHECKLIST 4 - INSTRUCTIONAL MATERIALS		
Course Title	Course No.	Scheduled Review Date
<p>INSTRUCTIONS: Review the checklist below, determine the training adequacy for each review element and assign one rating code per item or indicate Yes/No as applicable. Include comments concerning any additional areas reviewed in the "remarks" section.</p>		
<p>RATING CODES: A - Adequate (Requirements being met) GA - Generally Adequate (Minor attention needed) I - Inadequate (Major attention needed) NA - Not applicable (Does not apply)</p>		
REVIEW ELEMENTS		RATING
1. Instructional Modules (Self-Paced Course)		
a. Learning Objectives correspond to Curriculum Outline		
b. Lesson Topic Summaries		
c. Lesson Topic Programmed Instruction		
d. Lesson Topic Narratives		
e. Lesson Topic Progress Checks		
f. Audio/visual materials		
g. Enrichment Resources		
2. Instructor's Guide (Group-Paced Course)		
a. Front Matter		
b. Lesson Topic Guides		
3. Learning Supervisor's Guide (Self-Paced Course)		
a. Front Matter		
b. Learning Supervisor Orientation		
c. Learning Supervisor's Remediation Guides		

FIGURE 4-3, Page 10

4. Student's Guide (Group-Paced)	
a. Front Matter	
b. Instruction Sheets	
5. Student's Guide (Self-Paced)	
a. Front Matter	
b. Student Orientation	
c. Lesson Topic Summary Sheets	
6. Training Aids/Devices; other Audio/Visual Materials	
a. Classroom/Learning Center	
b. Laboratory/Shop	
7. Additional Training Resources	
a. Facilities: Classrooms/Learning Centers, Laboratories/ Shops	
b. Environmental Conditions:	

FIGURE 4-3, Page 11

CHECKLIST 4		REMARKS	
<p>Explain each "inadequate" rating and indicate the corrective action already in progress, or recommend appropriate action.</p>			
<p>SUMMARY</p>			
MATERIAL	ACTION DUE DATE	RESPONSIBILITY FOR ACTION	ACTION COMPLETED DATE
INSTRUCTIONAL MODULES			
INSTRUCTOR'S GUIDE			
LEARNING SUPERVISOR'S GUIDE			
STUDENT'S GUIDE (GROUP-PACED)			
STUDENT'S GUIDE (SELF-PACED)			
TRAINING AIDS/ DEVICES OTHER A/V MATERIALS			
ADDITIONAL TRAINING RESOURCES			
SIGNATURE OF REVIEWER	JOB TITLE		DATE REVIEW COMPLETED

FIGURE 4-3, Page 12

CHECKLIST 5 - COURSE PLANS AND DATA

<u>Course Title</u>	<u>Course No.</u>	<u>Scheduled Review Date</u>
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INSTRUCTIONS: Review the checklist below. Determine the training adequacy for each review element and either assign one rating code per item or indicate Yes/No as applicable. Include comments concerning any additional areas reviewed in the "remarks" section.

RATING CODES:

A - Adequate (Requirements being met)
 GA - Generally Adequate (Minor attention needed)
 I - Inadequate (Major attention needed)
 NA - Not applicable (Does not apply)

REVIEW ELEMENTS	RATING
1. Course is based on valid Course Job Task Inventory provided by Job Task Analysis	- - - -
2. Course testing program is based on Criterion Testing	
3. Instructional support materials are adequately stockpiled and supplied	- - - -
4. Equipment/Test Equipment is maintained in sufficient quantity and satisfactory condition	- - - -
5. Student input quotas are compatible with course instructional capability	- - - -
6. Entry students meet established course prerequisites	
7. Sufficient monitoring of course is conducted to identify developing problems and deficiencies	- - - -
8. Required reports are submitted regularly within prescribed deadlines	- - - -
9. External evaluation data is utilized effectively for	- - - -

CHECKLIST 5 - COURSE PLANS AND DATA

Explain each "inadequate" rating and indicate the corrective action already in progress, or recommend appropriate action.

SUMMARY

COURSE PLANS AND DATA	ACTION DUE DATE	RESPONSIBILITIES FOR ACTION	ACTION COMPLETED DATE
SIGNATURE OF REVIEWER	JOB TITLE		DATE OF REVIEW

FIGURE 4-3, Page 15

the courses involved will be referred to the applicable TPC under CNTECHTRA for resolution.

Type C changes will be reviewed by the Course Development Manager and implemented with copies to Participating Training Activities. Follow-up procedures shall be established by the Course Development Manager to monitor actions being taken and ensure documentation when completed.

1.1.2.1 Course Review Records. Course Review records for each course shall be retained by the school/course for two years. Review records shall include completed checklists, record of review within the school, and evidence of actions taken with follow-up data that may be appropriate. All actions taken shall be in accordance with the Course Audit Trail. Files shall be kept current and available to concerned school staff personnel when requested.

1.1.2.2 Annual Report of Completion of Course Reviews. An annual report of completion of Course Reviews shall be submitted to CNTECHTRA. Course Review records shall be available for CNTECHTRA review upon request, and will be one of the subjects of command inspections.

1.2 EXTERNAL EVALUATION PROCEDURES

External evaluation or appraisal is that which occurs outside of the training activity and is commonly referred to as fleet evaluation. It is absolutely necessary that personnel conducting a course receive evaluation feedback from this source.

1.2.1 DATA PROVIDED THROUGH EXTERNAL EVALUATION

Two general types of data are provided through External Evaluation. The first type is summative in nature and reveals how well course graduates can, in fact, perform the job for which they are trained in the course after they enter the actual job environment.

The second type is formative in nature and is of greater consequence both to the course and fleet activities because it provides data on whether the Learning Objectives of the course are, in fact, the Learning Objectives that must be achieved for successful job preparation. External Evaluation data obtained outside of the training activity can be collected by several methods.

Among these methods are:

1.2.1.1 Graduate Questionnaires. Questionnaires are administered to graduates of a course after they report to their job environment. The information the responses to this questionnaire provides is data describing training transfer to job situation and job-relevancy of the training provided.

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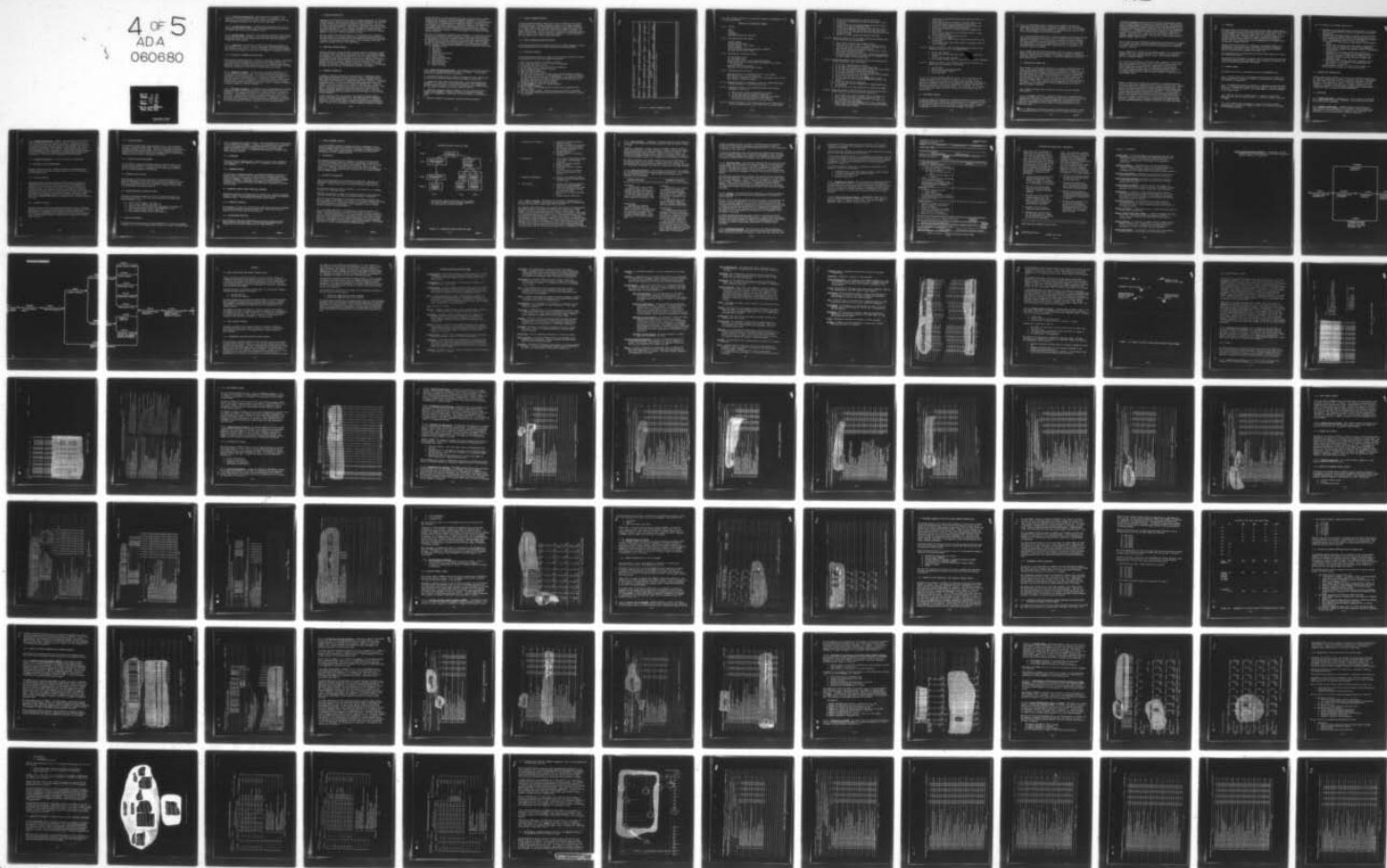
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1.2.1.2 Supervisor Questionnaires. Questionnaires are completed by the supervisors of course graduates assigned to their job environment. The responses to these questionnaires provide data to the training activity from fleet management personnel to be used for course evaluation.

1.2.1.3 Job Environment Visits. A subject-matter specialist visits the job environment where course graduates have been assigned and gathers data from first-hand observations of the graduates at work.

1.2.1.4 Analysis Teams. Composed of subject-matter specialists, Task Analysis Team members and support personnel as required, these teams make comprehensive surveys and perform critical analyses that often affect entire rating and occupational field training.

1.2.1.5 Unsolicited. Many methods or channels are operating informally and non-systematized in this area. Letters and messages from Commanding Officers, type, squadron, wing, station, and fleet commanders, as well as system commands and other external agencies, provide data for summative or formative evaluation.

1.2.2 UTILIZATION OF EXTERNAL EVALUATION DATA

After the data has been gathered or collected as mentioned, analysis is performed to determine the effectiveness and efficiency of the related course. The training activities utilizing the data will be able to determine where adjustments must be made in accordance with the Course Audit Trail in order to provide responsive, high-quality, job-relevant training to meet fleet needs.

1.2.2.1 Adequacy of Training. The first use of the data provided will be in the determination of whether or not the training presently being conducted is adequate for meeting fleet needs. If, in fact, the course graduates perform adequately in the job environment it is an indication that the training is valid and adequate. When the graduates, in significant numbers, cannot perform satisfactorily in the job environment, it is an indication that the training received was inadequate and requires improvement, (result of summative feedback) or revision (result of formative feedback).

1.2.2.2 Relevancy of Training. In instances where job performance is considered inadequate, analysis usually reveals that the Learning Objectives which were developed for the training being conducted no longer correspond to current job requirements. Requirements are subject to change because of the advent of new systems, techniques and procedures constantly being introduced to improve the overall readiness state of the operating forces. Personnel in the training environment have the responsibility of keeping current with these developments and providing responsive, relevant training to meet the changing demands.

1.3 TRAINING RESPONSIBILITY

Regardless of the structure of the overall training organization, the individual training course or school personnel retain the final responsibility to provide the most effective and efficient job-relevant training possible. The data provided by Internal and External Evaluation is essential if the school/course is to meet this responsibility. Often the training activity does not have the resources available, (i.e., time, manpower and money) to conduct External Evaluation and therefore, must rely heavily on the data collected by external agencies if they are to maintain effective training.

The data acquired from sources external to the training activity, combined with the results of the Internal Evaluation, establish the guidelines for the individual training course personnel to accomplish necessary course improvement in terms of both currency and job-relevancy. The Course Audit Trail will always be the basis for this course improvement.

2.0 MONITORING STUDENT PROGRESS

Students enrolled in a Naval Technical Training course are expected to possess the necessary entry requirements (pre-requisites) which are determined during the design of the course and are published in the course description in CANTRAC and described in the control documents of the course. Student progress is continually monitored and measures are taken by course personnel to bring about results that are for the best interests of the Navy and the student. These measures include counselling, remedial training, acceleration of training, extension of training, or elimination from training. Procedures to be followed in these areas are provided in succeeding sections of this manual.

2.1 PREVENTIVE COUNSELLING

A program of intensive preventive counselling shall be instituted in each school administering Naval Technical Training Courses. CNTECHTRA Research Report RBR 9-73 describes one such program and provides evaluative data on a pilot-effort which resulted in a significant reduction in attrition. Preventive counselling refers to a student-instructor/learning supervisor interaction designed to help the student solve a variety of problems, many of them non-academic, which are deterrents to his success in the learning situation. This type of counselling is most effective when conducted by a person who is a mature, technically qualified, sincere, and motivated leader. Objective techniques for identifying such persons have been developed and are available through CNTECHTRA.

A Senior Counsellor shall be selected by the cognizant Training Officer, either as full-time or collateral duty. The Senior Counsellor's immediate supervisor is the Training Officer. The Senior Counsellor will supervise, coordinate, and direct the Student Preventive Counselling Program within the school. He will act as coordinator of other designated counsellors assigned

within the school. He will coordinate and ensure a high standard of student counselling by continually observing designated counsellors. The Senior Counsellor will continually monitor the Student Preventive Counselling Program to ensure that the administrative procedures pertaining to the program are being adhered to by each counsellor. The Senior Counsellor will ensure that all assigned instructors/learning supervisors are evaluated as to their counselling potential, and all counsellors, including the Senior Counsellor shall be selected on the basis of their performance on the Strong Vocational Interest Inventory.

This type of counselling is preventive and non-hostile. It should be conducted as soon as a discrepancy between a student's potential and his performance becomes apparent, and prior to academic failure. The Senior Counsellor shall be responsible for the proper referral of all students who require assistance not readily available within the school through the normal chain of command. He shall possess a general working knowledge of the following representative areas as necessary to advise/refer students who require additional counselling:

1. Chaplain's Office
2. Red Cross
3. Navy Relief
4. Disbursing
5. Personnel Classification
6. Credit Union
7. Education Office
8. Senior Enlisted Advisor
9. Human Resources
10. Disciplinary Office
11. Medical Services
12. Special Services

2.1.1 Student Problem Identification. Each training activity shall establish guidelines for the identification of student difficulties. The following may serve as indicators of these difficulties:

1. Discrepancy between student's potential as measured by Basic Battery Test Scores and Course Pre-Tests results and/or performance in the course.
2. Significant trend toward reduced achievement of Learning Objectives not comparable to the difficulty of the technical material. Such decrease may not have reached the point of failure but decreases from one Progress Test to the next should be examined for possible student difficulty.
3. Significant change in student's behavior; such as, repeated failure to prepare class assignments, excessive tardiness, increases in laboratory accidents or sluggishness in laboratory or shop performance, or sleeping in class.
4. Results of student "rap sessions" conducted by school personnel.

2.1.2 STUDENT INFORMATION RECORD

A Student Information Record, Figure 4-23, will be utilized for all courses and maintained on all students counselled as part of the Student Preventive Counselling Program. This Record shall be handled as privileged information at all times. The Student Information Record shall remain on file with the Senior Counsellor for a period of one year after the student graduates or is dropped from training. The date and nature of significant counselling sessions shall be entered in the remarks section with emphasis on problem description and the ultimate result of the counselling session.

2.1.3 SENIOR COUNSELLOR/COUNSELLOR TRAINING

All training activities shall establish in-service training programs to provide counselling personnel with increased communication/counselling skills.

2.1.4 COUNSELLING SESSIONS

Counselling Sessions between the student and the counsellor should be conducted in accordance with the following suggested guidelines:

1. Have a goal--to evaluate, to inform, to motivate.
2. Have a plan--know how you want to conduct the interview.
3. Be yourself--don't put on an act.
4. Let the student settle down and relax before beginning.
5. Use the direct approach whenever possible.
6. Watch for evasive answers.
7. Search for the accurate answer.
8. Give the student enough time to think about a question before he answers. Let him falter and flounder, but let him finish. If you finish a statement for the student he will know what you think, but you can only guess at what he thinks. Keep still and listen--he may finish his statement in a way completely different from what you expected.
9. Ask why and how and expect definite answers.
10. Ask one question at a time--not double questions.
11. Speak in simple language.
12. When in doubt, use the summary method to make sure you understand the student's answer.
13. Don't take sides or argue. Make your questions as neutral as possible.
14. Give the student time to ask questions--particularly if he wants to clarify your questions.

NAME (Last, first, and middle initial)				RATE		SSN	
CO./BN.	LOCATION	DATE STARTED SCHOOL		NAME AND RATE/RANK OF COUNSELOR			
CCT/GT	ARI/EL	MECH/GM	CLERK	SP/PA	ETST	MT	PRE COMP
BIRTH DATE	EDUCATION	FURTHER COUNSELLING RECOMMENDED PERSONAL					
		<input type="checkbox"/> YES <input type="checkbox"/> NO		ACADEMIC		<input type="checkbox"/> YES <input type="checkbox"/> NO	
REMARKS (Use reverse side if more space is required.)							
STUDENT INFORMATION RECORD							

FIGURE 4-23 STUDENT INFORMATION RECORD

2.1.5 The following checklist for counselling students is recommended for use in counselling sessions:

CHECKLIST FOR COUNSELLING STUDENTS

2.1.5.1 Setting

Quiet
Private
Comfortable
Adequately lighted and ventilated

2.1.5.2 Pre-Counselling Session Checks

Student progress
Standard Battery Scores
Previous academic board actions
Student comments
Instructor/Learning Supervisor/Counsellor comments
Any other material about student

2.1.5.3 Conducting the Counselling Session

Put the student at ease
Let the student talk
Ask questions designed to keep the student talking
Remain neutral; do not refute student statements; do not answer for the student
Keep the student on the subject
Summarize the counselling session content

2.1.5.4 Counselling Session Follow-up

Lead the student to an acceptable solution to his problem
Make him feel that it is his decision
Get a definite commitment from the student concerning a plan of action
Don't forget to check his progress

2.1.5.5 Suggested Questions for Counsellors to ask in a counselling session to derive information on indicated areas follow.

2.1.5.5.1 Appropriate answers to the following questions will indicate motivation or lack of it.

1. What are your reasons for attending this school?
2. Is this the rating you wanted to strike for?
3. Do you understand the reasons for achieving the Learning Objectives in this (Lesson Topic, Unit, Module)?
4. Do you have a sincere desire to pass this course?

2.1.5.5.2 Appropriate answers to the following questions will indicate good or poor classroom/learning center conduct and note taking habits.

1. Do you actively participate in learning activities?
2. Do you try to understand the reason for each point as it is presented?
3. Do you review your notes during breaks and before leaving a subject to be sure you understand them?
4. Do you read assignments pertaining to the next day's work so you will have some idea of what the day's work will cover?
5. Do you go into the learning situation with questions about the material in mind?
6. Do you try to avoid missing any instructional time?

2.1.5.5.3 Appropriate answers to the following questions will indicate good or poor review and test taking habits.

1. Do you review carefully before taking a test?
2. Before you go to take a test do you feel confident that you have done your best to learn the material, and that, if you keep calm and think, you will pass the test?
3. Do you read each question carefully to be sure what is being asked before choosing an answer?
4. Do you pace yourself through the test, leaving those questions you cannot answer within a specified time to be answered after you have finished all other questions?

2.1.5.5.4 Appropriate answers to the following questions will indicate good or poor study habits after school hours.

1. Do you have a specific time for study?
2. Do you begin study promptly at the specified time?
3. Do you keep your study periods regular rather than long or short?
4. Do you rest periodically during study periods?
5. Do you return promptly to study after rest periods?
6. Do you make every effort to concentrate while you are studying?
7. Do you have a specific place for study?
8. Does the place you have for study suggest study to you?
9. Is your study place free from distracting noise, people, and objects?
10. Do you take time out for recreation?
11. Do you feel that you are "missing out" on things because you are studying?
12. Do you try to do all your studying for the week in one night?

2.1.5.5.5 Appropriate answers to the following questions will indicate good or poor habits in concentration and daily preparation.

1. Do you always try to get the general idea of the subject and what you are to know when a learning session is over?
2. Do you always try to get the main points of the Lesson Topic in a form that can be reviewed?
3. When you read home study assignments do you try to understand tables, graphs, and diagrams in the test, and material written in bold face type or italics?

4. Do you try to discriminate between major and minor points in a Lesson Topic?
5. Do you make an effort to answer all questions asked by the instructor whether they are directed to you or not?
6. Do you ask yourself questions about the material like those asked by the instructor/learning supervisor?
7. Do you make every effort to get the material presented the first time?
8. Do you use any spare time you have during the day to review what you have learned?
9. Do you daydream during learning sessions?
10. Do you study with others?
11. Do you study with others before or after you are sure you know the material?
12. Do you consult with others when there is a particular point you don't understand?

2.1.5.5.6 Appropriate answers to the following questions will indicate proficiency, or the lack of it, in reading ability.

1. Do you read rapidly?
2. Can you pick out the main ideas in what you read quickly and easily?
3. Do you verbalize when you read?
4. Do you make a special effort to learn new words and their meanings?

2.1.5.5.7 Appropriate answers to the following questions will indicate the general physical condition of the student.

1. Are you well?
2. Have you any uncorrected handicaps?
3. Do you get plenty of sleep?
4. Do you eat well?

2.1.5.6 All of these questions need not be used. If, in the course of the counselling session, one of these factors appears to be a cause for the student's problem these questions can be used to probe the area. Questions need not be confined to these, nor is the language of these questions mandatory. Any question designed to get the same information is suitable. Be alert to student reactions as well as student answers. Often resistance to, or evasion of, a question will reveal more about the area to be investigated than the answer itself.

2.2 ACCELERATED TRAINING

A training program which provides for accelerated training is one which permits exceptional students to complete the training prescribed in a group-paced course in less than the normal time allotted for the course. In a self-paced course, the accelerated training concept is normally not applicable since a student is expected to progress at his optimum rate throughout the course.

2.2.1 In a group-paced course, a student who is capable of successfully completing a Unit Criterion Test, indicating achievement of all the Learning Objectives for the Unit, shall be permitted to progress to the next succeeding Unit. This acceleration will be allowed to continue from Unit to Unit so long as all Criterion Tests are completed successfully.

2.2.2 Students received whose level of previous experience and training indicates that their proficiency upon entry in a course is greater than that normally expected of a graduate of the course, shall be permitted to accelerate through the entire course by successfully completing the Course's Criterion Post-Test, or a combination of all the Unit/Module Criterion Tests for the course. The enrollment record of the student shall indicate that he is a graduate of the course for which he is examined.

2.2.3 Students who are accelerated through courses that contain a significant number of skill-type Learning Objectives which must be achieved by lab/shop "hands-on" activity shall be required to successfully complete the accompanying Performance Criterion Tests in addition to successful completion of the Unit/Module Criterion Test. D

2.3 EXTENSION OF TRAINING TIME

When a student in a group-paced course fails to achieve Learning Objectives of a Unit of the course, normally the practice of assigning an extension of training time (academic setback) has been followed when it is clearly indicated that repetition of the training for the Learning Objectives not achieved, and Criterion Re-Testing on these Learning Objectives is in the best interest of both the student and the Navy. In no case shall an "automatic setback policy" be allowed, and any setback for reasons of scholastic failure shall be the subject of Academic Board action in accordance with the procedures outlined in this manual. In all cases, Academic Board recommendations for setbacks must be approved by the Training Officer of the school administering the course in which the student is enrolled.

2.3.1 Academic setbacks shall continue to be allowed, with the following modifications.

2.3.1.1 An academic setback in a group-paced course will be considered by an Academic Board only after a student fails to satisfactorily achieve the standards specified in a Criterion Test; receives remediation in the deficient areas indicated by the results of the Criterion Test; and, subsequently, fails a retake on a Supplementary Criterion Test of the Learning Objectives in the deficient areas.

2.3.1.2 Remediation in group-paced courses following initial failure to achieve the standards specified in a Criterion Test shall be provided through the use

of Remedial Programmed Instruction booklets developed in appropriate format to cover the Learning Objectives tested by all Criterion Tests. The appropriate Remedial Program, marked to indicate those frames covering Learning Objectives in which the student has displayed deficiency, shall be administered as soon as possible after initial failure, followed by the retake of the Supplementary Criterion Test. The Remedial Program and test retake will be administered at the earliest time that will not conflict with the student's normal class schedule. The student will continue with his class unless he fails to satisfactorily complete the test retake. In that case, he shall become subject to immediate Academic Board action.

2.3.1.3 Until such time as Remedial Programs have been developed by all courses for Criterion Test areas, the necessary remedial instruction will be provided by qualified instructors, and the procedures outlined above will be otherwise followed as indicated.

2.3.1.4 Extensions of training for non-academic reasons (i.e., hospitalization, emergency leave, etc.) shall be granted at the discretion of the Training Officer of the school administering the course. Such extensions may be in addition to academic setbacks.

2.3.2 In view of the nature of self-paced courses, setbacks in the sense that they exist in group-paced courses, do not occur in self-paced courses. However, students who fail to successfully complete Module Criterion Tests receive remediation in deficient areas of the Module, and this does in reality extend their training time. Following the prescribed remediation, if a student unsatisfactorily completes corresponding portions of the Supplementary Module Criterion Test, he shall be subject to immediate action of an Academic Board. A

Remedial instruction has normally been considered to be planned instruction conducted outside normal training hours, and at stated periods, for those students who indicate the need for additional study to maintain class progress. This concept of remedial instruction was directed toward group-paced courses, and students with specific deficiencies in the achievement of Learning Objectives were provided with guidance from qualified instructors. A plan to provide remedial instruction shall be instituted in all group-paced courses, and in no instance shall remedial instruction be utilized for disciplinary purposes. Where it is feasible, the facilities of a self-paced course should be made available to students outside of normal training hours for additional study time with learning supervisors available to provide any necessary assistance. e

2.5 ATTRITION

Sufficient grounds for elimination from training from either a group-paced or self-paced course shall be constituted when a student demonstrates his inability or unwillingness to achieve the Learning Objectives of the course. Both inability (ineptitude - knowledge phase, skill or performance phase or both) and unwillingness (lack of application usually resulting from negative or insufficient positive motivation) can produce course failure and end in academic drop from training based on the recommendation of an Academic Board and approved by higher authority.

Students may also be dropped from training for non-academic reasons (e.g., administrative including low-quality discharge or fraudulent enlistment; unsuitability; disciplinary action; lack of necessary security clearance; physical disqualification; dependency discharge; etc.)

All recommendations for elimination from training (drops) shall be the result of Academic Board action.

Disenrollment and reassignment procedures, service record entries and problems concerning obligated service requirements shall be handled in accordance with current Bureau of Naval Personnel instructions.

2.6 ACADEMIC BOARDS

An Academic Board shall be established within each NTECHTRACOM course.

2.6.1 It shall be the duty of the Academic Board to interview students concerning acceleration of training, extension of training time, or elimination from training, as appropriate.

2.6.2 The Academic Board shall be composed of a Chairman and three additional members. The Chairman shall appoint one of the members of the Board to serve as recorder. The recorder will be a non-voting member on actions recommended by the Academic Board.

2.6.3 Where the size of the onboard load of a course (or school which administers more than one course) warrants it, additional Academic Boards may be formed.

2.6.4 The Academic Board is designed to evaluate the student and make recommendations concerning his progress; it shall in no instance be utilized for disciplinary purposes.

2.6.5 The duties of the Academic Board are to:

1. Recommend to the Training Officer a course of action to be taken when it is determined that a student is qualified to accelerate his training.
2. Recommend to the Training Officer a course of action to be taken when a student has failed to achieve the Learning Objectives of the training being provided based on his performance on Criterion Tests. Recommendations shall be one of the following:
 - a. Extension of training time by class setback in a group-paced course.
 - b. Probationary continuance with class (CWC) in a group-paced course. CWC in a group-paced course follows remediation (using Remedial Program) and successful retake of Supplementary Criterion Test.
 - c. Continuance of self-paced training with provision for remediation prior to resumption of prescribed sequence of self-paced instruction. Time spent on remediation and retesting obviously represents extension of time in the self-paced course.
 - d. Elimination from training, indicating recommended type of drop (Academic or non-academic) and recommendation for disposition of the student.
3. Maintain adequate records. In cases of disenrollment, the records shall be retained for no less than one year.

3.0 STANDARD TIME CONSIDERATIONS

Although instructional capability of a course is essentially determined by its capacity in quantities of personnel, equipment, and space, time available for the effective and efficient use of these three resources is likewise important. Since personnel to support a technical training course (both "instructor" or support personnel) will be limited, utilization of time becomes most important. It is necessary to effect certain standardization to govern the use of training time within NTECHTRACOM.

3.1 DEFINITIONS

3.1.1 Standard work week. For Class A, C, F, and R, officer and enlisted, naval courses under the command of CNTECHTRA, the standard work week shall not be less than 40 clock-hours.

3.1.2 Standard training week. A minimum average of 30 contact-hours (1800 minutes) of each work-week will be devoted to technical instruction. Administrative time (non-instructional time) will not be included in the computation of the 30 contact-hours of technical instruction.

3.1.3 Standard Training Day. Normally, the training day will consist of eight scheduled periods of instruction. Ideally, class periods should be of 45-50 minutes duration (except laboratory, programmed instruction, and self-paced courses which may require in some instances less time than the typical period and in others double or triple periods) with five-or ten-minute breaks between each class and a lunch period of appropriate length depending on local circumstances. Classes should normally commence not later than 0800 and be completed by 1700 except when double-shift requirements or similar unusual circumstances dictate otherwise.

3.1.4 Standard Contact Hour. An hour (60 minutes) of instruction.

3.2 VARIATIONS IN TIME CONSIDERATIONS

Regularly scheduled national holidays and unusual circumstances which include abnormal situations, unforeseen events, etc. shall be handled in the following manners:

3.2.1 NATIONAL HOLIDAYS

Known and regularly scheduled national holidays that are observed by NTECHTRACOM activities on an annual basis will not be included in the planning of or calculating of instructional days for Naval Technical Training courses. The schedule will not be rearranged in group-paced courses to permit the recovery of lost time from technical training by shortening the instructional periods to permit the inclusion of an additional instructional period(s) per day because of regularly scheduled holidays. Self-paced courses already eliminate holidays from their instructional days and no procedure is followed for "acceleration" of training to make up lost time.

3.2.2 ABNORMAL SITUATIONS

Abnormal situations will arise occasionally because of special unforeseen events which will result in some time-loss from planned technical training. Acceleration by rearrangement and shortening of some schedules and instructional periods may be used to make up time lost in these instances (e.g., temporary power outages, inclement weather causing short duration time loss, etc.)

3.2.3 DISASTER SCHEDULE

The possibility always exists that a disaster such as, fire, hurricane, tornado, or flood may disrupt normal functions of activities beyond that described elsewhere in this chapter. While the definitions and limitations established are educationally sound, they may be disregarded following a disaster in order to permit training to be resumed with all possible haste commensurate with facilities and personnel available.

3.2.4 EXCESSIVE TRAINING REQUIREMENT

In the instance a training requirement exists in which the need for such training becomes paramount to all other considerations, it is expected that the training day will be lengthened and the training week expanded until the training emergency is alleviated.

4.0 INSTRUCTOR QUALIFICATIONS

Naval Training is sufficiently important in scope and difficulty that personnel designated as instructors/learning supervisors represent a select group who have demonstrated by their performance and achievement through training and experience that they are qualified to assume a special role in the achievement of the Navy's Mission.

4.1 INSTRUCTOR/LEARNING SUPERVISOR TRAINING

Instructors and Learning Supervisors receive instructor training at the activities listed below. Those activities asterisked also conduct Navy School Management Courses.

- * 1. Service School Command, San Diego, CA
- * 2. Service School Command, Great Lakes, IL
- * 3. Naval Air Technical Training Center, NAS Memphis, Millington, TN
- 4. Fleet Training Center, Norfolk, VA (COMTRALANT Activity)
- 5. Naval Officer Training Center, Newport, RI
- 6. Naval Submarine School, Groton, New London, CT

4.2 TRAINING REQUIREMENTS

All officer and enlisted personnel occupying CHNAVPERS "I" billets are required to complete one of the three training paths offered in Instructor Training Courses

prior to assuming their respective duties. The path completed must be appropriate to the ultimate duty assignment. It shall be the responsibility of the activity to which the prospective instructor/learning supervisor is being ordered to notify the cognizant Instructor Training Course of the particular path, Figure 4-43, he is to enter. All prospective instructors will complete path 1 unless otherwise directed.

4.2.1 RETRAINING

Instructors who have completed path 1, Figure 4-35, and are later assigned to a self-paced course, must complete path 2 or 3 depending on their particular duty assignment. R

4.2.2 REFRESHER TRAINING

All instructors, learning supervisors, and supervisors/managers returning for repeated tours of "I-Billet" duty in Naval Technical Training courses will first be enrolled in the respective course(s) which are prerequisites to their particular assignment. Because some (or all) of this training may be refresher training for particular individuals, these personnel shall be allowed to accelerate any, or all, of the courses by satisfactorily completing all required Criterion Tests.

4.3 INSTRUCTOR TRAINING COURSE OPERATIONAL PROCEDURE

Standardized operational procedures must be followed in all Instructor Training Courses to ensure that all prospective instructor personnel receive standardized training in path 1. These operational procedures shall include:

4.3.1 INSTRUCTOR SCHEDULING

The assignments of Instructor Training Course staff instructors will be scheduled so that each prospective instructor (student) will receive instruction and evaluation from at least three staff instructors.

4.3.2 INSTRUCTIONAL TELEVISION

Each prospective instructor following path 1 will have at least one of his practice presentations video-taped. The video-taped presentation will be reviewed with the prospective instructor by a staff instructor.

4.4 SCHOOL MANAGEMENT TRAINING

All enlisted/officer personnel occupying any level of management of Naval Technical Training Courses are required to satisfactorily complete the Naval Schools Management Course within 6 months of assuming a supervisor/manager assignment. Attendance by the Commanding Officer/Executive Officer is discretionary with the Commanding Officer.

4.5 CERTIFICATION

Each graduate that satisfactorily completes the Instructor Training and/or Navy Schools Management Course will receive an appropriate certificate in accordance with the Enlisted Transfer Manual NAVPERS 15909B. The certificate for instructors/learning supervisors will indicate the particular path, Figure 4-35, completed. Enlisted Classification (NEC) will be recommended by cognizant activity Commanding Officers as specified in the Enlisted Transfer Manual, NAVPERS 15909B. R

4.6 EVALUATION OF INSTRUCTION

There are many approaches to the evaluation of instruction. Typically, in a group-paced course, the instructor is evaluated against criteria that are difficult to correlate with how well the student performs a particular job or task.

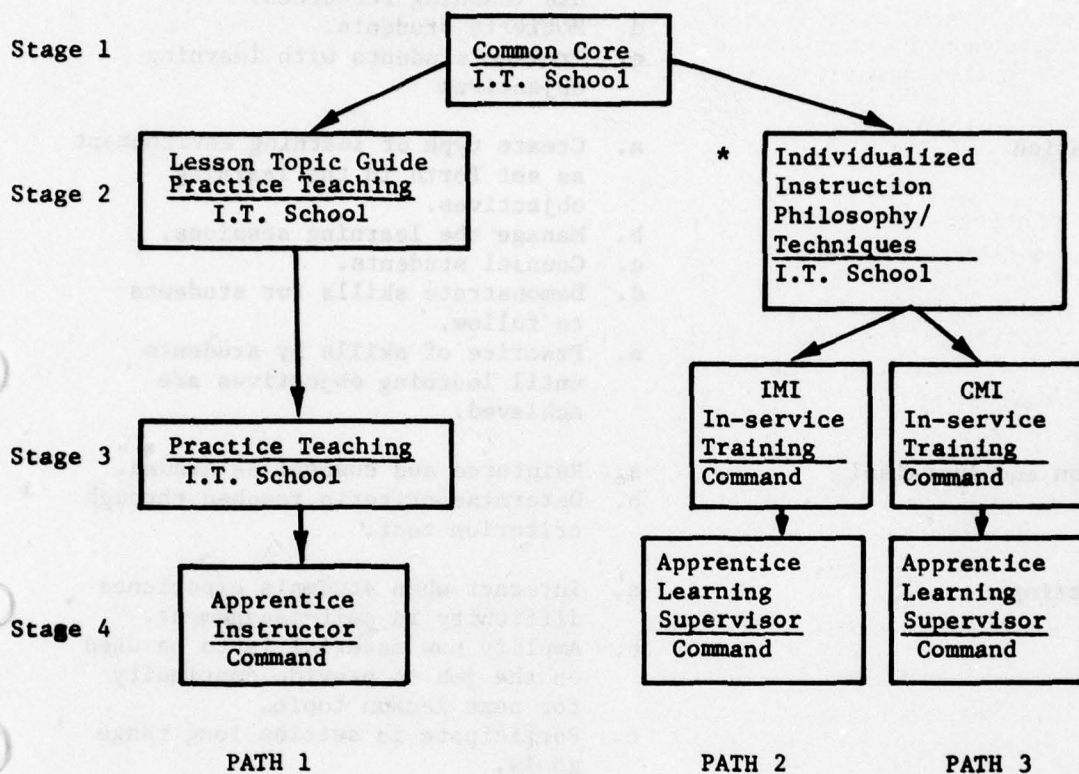
The same difficulties, and others, are inherent in the evaluation of a learning supervisor in a self-paced course.

Evaluation of personnel in either of the above situations is never completely objective because there are subjective (opinion) values to be examined.

The only objective measurement of instruction is the change of behavior that has been achieved by the student in accordance with the Course Learning Objectives. This measurement can be effected when a portion of instruction is completed and student performance is measured in terms of whether he "can" or "can't" perform according to required standards.

4.6.1 The primary objective of any evaluation of instruction process is to determine existing deficiencies in specific course areas and effect corrective action. These deficiencies may exist in course material or instructor/learning supervisor methodology/performance. Evaluation of instruction always includes evaluation of the course material (Learning Objectives), instructor's/learning supervisor's performance as a vital link in the "instruction" being evaluated, and output in the form of student behavior (measured in accordance with Learning Objectives) as a result of the instruction being evaluated.

INSTRUCTOR TRAINING COURSE FLOW CHART



* Individualized Learning Supervisors will be released at the end of stage 2 to their assigned command for the third stage of in-service training.

FIGURE 4-35 INSTRUCTOR TRAINING COURSE FLOW CHART

1. Preparation for Learning

- a. Annotate Instructor's/Learning Supervisor's Guide
- b. Arrange for Instructional Material and Aids to be used by students.
- c. Brief students regarding ways to use learning resources.
- d. Motivate students.
- e. Provide students with learning objectives.

2. Presentation

- a. Create type of learning environment as set forth in the learning objectives.
- b. Manage the learning sessions.
- c. Counsel students.
- d. Demonstrate skills for students to follow.
- e. Practice of skills by students until learning objectives are achieved.

3. Summation and Appraisal

- a. Reinforce and counsel as needed.
- b. Determine criteria reached through criterion test.

4. Goal Setting

- a. Interact when students experience difficulty in self-management.
- b. Amplify how material is to be used on the job to provide continuity for next lesson topic.
- c. Participate in setting long range goals.
- d. Provide remedial instruction

4.6.1.1 What to Look For. Observation of instruction is performed for two major reasons: to evaluate the effectiveness of learning and to determine ways by which the instruction, however good, may be improved.

The competent observer/evaluator will recognize the Instructor's Guide/Learning Supervisor's Guide to be preparatory means and plans rather than ironclad documents from which there cannot be any deviation or modification. The salient point for the observer/evaluator to examine is the student's achievement of the Learning Objectives of a Lesson Topic. The observer/evaluator will allow for flexibility in the presentation of a Lesson Topic because of individual differences in instructor/learning supervisor teaching styles and personalities, and individual student achievements. The Lesson Topic Guide, as the name "guide" implies, is to be used by the instructor to build student interest and present information with clarity. The observer/evaluator will further recognize that in a self-paced course the emphasis is upon the student's managing and making decisions and the role of the instructor becomes that of a supervisor of learning.

4.6.1.2 How to Proceed. A supervisor or observer/evaluator should develop a relationship with instructors/learning supervisors based upon mutual respect and trust.

Optimally, a supervisor, through a series of informal classroom/laboratory visits and discussions, will have established a rapport with his instructors/learning supervisors prior to making a formal evaluation visitation. This approach builds self-confidence and is conducive to a warm, natural, and cooperative atmosphere during observation and a receptiveness on the part of the instructor/learning supervisor to suggestions during follow-up critiques.

The observer/evaluator will acquaint himself with the course materials for the specific session he will attend. He must always have a list of the Learning Objectives for the particular session that he is observing, not only for a valid base of departure, but also for a final check on student progress.

4.6.1.3 Timing the Evaluation. Two acceptable procedures have been followed for observation/evaluation of instructors/learning supervisors: the scheduled and the unscheduled evaluation. Each of these two procedures has its advantages and disadvantages.

SCHEDULED EVALUATION

Advantages:

By scheduling a date allowing a reasonable time to prepare, the evaluator can observe an instructor/learning supervisor who is geared to function at high efficiency and thus set the maximum standard which should regularly be expected of him.

Disadvantages:

The instructor/learning supervisor performs as he was taught in Instructor Training Course, but it may not be a valid sample of his day-to-day performance. The evaluator perhaps observes a "show" rather than a "real-life" presentation.

UNSCHEDULED EVALUATION

Advantages:

An unscheduled visit permits the evaluator to observe the instructor/learning supervisor in his normal mode of teaching/counselling and can achieve a more realistic appraisal of his instruction.

To take advantage of this form of evaluation, adequate rapport and mutual respect must have been previously established.

Disadvantages:

An inexperienced instructor/learning supervisor lacking self-confidence, or seeing an unfamiliar face, may feel threatened to such a degree that he would fall far short of his normal capability.

An experienced instructor/learning supervisor may react to the observer/evaluator and switch to the standard Instructor Training Course approach rather than his usual style, thus presenting an invalid demonstration of his ability.

Whichever procedure is used, the value of establishing good relationships between supervisors/observer-evaluators and the instructional staff is invaluable, and the instructors/learning supervisors must, at least periodically, be observed as they really are.

If time and circumstances allow, both scheduled and unscheduled evaluations should be employed, taking care to achieve the advantages of each. In either case, the observer/evaluator will observe all proceedings as inconspicuously as possible, avoiding obvious note-taking or any other distracting action.

4.6.1.4 Evaluation Forms. The Instruction Evaluation Record, used as directed in this manual, has been designed to encourage evaluation of the elements of learning rather than to focus on "nit-picking" or emphasize "by-the-numbers" teaching. The experienced evaluator will be cognizant of the presence or absence of techniques and personal characteristics of the instructor/learning supervisor, which either strengthen or distract from effective learning in the session.

The Instruction Evaluation Record, Figure 4-40, contains its own instructions which are self-explanatory. Although most responses called for on the evaluation record are definite in nature, a section is provided for a general evaluation in terms of "superior, competent, and requires additional training to qualify." This section will be helpful in expressing an overall opinion regarding the session as witnessed by the observer/evaluator and can be used as a bench mark to gauge future professional growth of the instructor/learning supervisor.

4.6.1.5 Critique. Soon after the formal observation, a follow-up conference should be arranged with the instructor/learning supervisor to discuss the session observed.

The mood of this conference should definitely be relaxed, non-threatening, and positive. Here is an opportunity for both the observer/evaluator and the instructor/learning supervisor to participate in goal-setting rather than just following the usual method of commending the instructor/learning supervisor for the things he did well and making constructive suggestions for improvement. The observer/evaluator will encourage the instructor/learning supervisor to ask questions and to seek guidance concerning how he can contribute to the improvement of learning.

The instructor/learning supervisor shall receive a written report of his follow-up conference with the observer/evaluator. A copy of the Instruction Evaluation Record with appropriate comments and recommendations by the observer/evaluator will normally provide the instructor/learning supervisor with information on which to base planned improvements in techniques and/or procedures.

4.6.1.6 Evaluation Procedures. Every instructor and learning supervisor, those instructional supervisors who teach and learning center supervisors who manage learning centers shall be evaluated at least four times each year, with

approximately 90 days lapsing between each evaluation. More frequent evaluation is encouraged, and is necessary in the instance inadequate instruction is observed.

Corrective action, conducted in accordance with sound educational principles, shall be taken when discrepancies are observed.

The Instructor Evaluation Record is to be completed in triplicate. One copy is for record purposes and will be required by the Chief of Naval Technical Training at such times as the need for review of instructional performance is indicated. A copy is also maintained in the instructor/learning supervisor's record file.

All types of personnel listed below are required to participate in the program of evaluation of instruction.

1. Training officers, assistant training officers, course officers.
2. Course/Unit Supervisors, Branch/Section Heads.
3. Learning Center Supervisors.
4. Education Specialists.

4.6.1.7 Disposition of Records. When an instructor or learning supervisor is transferred from one activity to another within the Naval Technical Training Command for instructional duty, the Instruction Evaluation Records file for the individual transferred shall be forwarded to the activity to which the instructor or learning supervisor is transferred; upon transfer for any other reason, the Instruction Evaluation Records files shall be destroyed.

4.6.1.8 Instruction Evaluation Record. CNTECHTRA-GEN 1540/42 will be available within approximately 30 days after receipt of this manual as a Cognizance Symbol I, Material Control Code L item from the Supply Department, Naval Air Station, Pensacola, Florida.

INSTRUCTION EVALUATION RECORD
CNTECHTRA-GEN 1540/42

DATE

Course	Unit/Period	Instructor/L.S.	Rate/Grade
Lesson Topic Title			

Instructional Strategy

☐ Group-Paced

☐ Self-Paced

Evaluator has previewed the Instructor's/Learning Supervisor's Guide and Instructional Modules. ☒ Yes ☐ No

(Signature) _____

GUIDE FOR EVALUATION

COMMENTS

ELEMENTS OF A LEARNING SESSION:

1. Students are prepared for learning.
 - a. Learning Objectives are provided.
 - b. Motivated in terms of:
 - (1) How the material is to be used.
 - (2) Why the material needs to be learned.
2. Rapport is established and maintained in a professional manner.
3. Clarification, amplification, and reenforcement of the Learning Objectives are provided as necessary for achievement.

TECHNIQUES:

1. Evidence of effective use of:
 - a. Medium (media)
 - b. Instructional skills
2. Flexibility in adjusting to planned and extemporaneous learning situations.
3. Management of time.

STUDENT RESPONSE:

1. Evidence of student and instructor/learning supervisor interaction.
2. Class involvement.
3. Evidence of attainment of Learning Objectives through Criterion Tests.
4. Choice and use of resources.
5. Demonstration of self-management.

Did the students achieve the Learning Objectives?

☒ Yes ☐ No

Did the instructor/learning supervisor and student select and use media and/or facilities advantageously?

☒ Yes ☐ No

Did the instructor/learning supervisor demonstrate adequate capability in the utilization of learning materials?

☒ Yes ☐ No

General Evaluation of Instruction:

☐ SUPERIOR

☐ COMPETENT

☐ REQUIRES ADDITIONAL TRAINING

Additional Comments: (Use other side)

GUIDELINES FOR EVALUATION OF INSTRUCTION

These guide lines are designed to assist both the evaluator and the "instructor" in improving instruction. The evaluator should discuss notes made on the evaluation soon after the observation. The relationship between the instructor/learning supervisor and evaluator must be one of understanding and cooperation in which both work to reach the same goal in obtaining the maximum learning possible. Use the following procedures for observation and improvement:

1. Instructors/learning supervisors should be apprised that the purpose of a visit is to assist in the improvement of instruction, not to participate in the session.
2. Evaluator will inform himself about the instructor/learning supervisor, students, and work underway.
3. Evaluator will arrive before the learning session starts and locate a suitable place from which to observe; evaluate only that segment of the learning session actually observed.
4. Evaluator will avoid being conspicuous when taking notes.
5. Evaluator will use the items in the left-hand column as a guide for the evaluation of the session and evaluate all applicable

items; enter meaningful comments rather than grades or single words; remember that because of varied personalities and backgrounds, individual instructors/learning supervisors may use differing styles and teaching approaches to effectively accomplish their goals; an overall evaluation should be given on the basis of superior, competent, and requires additional training to qualify; place evaluation analysis in the space provided.

6. Evaluator will schedule follow-up conference with instructor/learning supervisor.
7. Evaluator will provide the instructor/learning supervisor with a completed copy of the Instruction Evaluation Record.
8. Evaluator will observe the instructor/learning supervisor in learning situations involving as many different methods/media as possible.
9. Evaluator will maintain a file of Instruction Evaluation Records for each instructor/learning supervisor for use in determining the extent of his improvement over an extended period of time.

Enter Additional Comments From other side.

SECTION 4 - DEFINITIONS

ACADEMIC BOARD - A board established in accordance with direction from higher authority in every NTECHTRACOM (NAVEDTRACOM) school/course to interview students concerning acceleration of training, extension of training, time, or elimination from training, as appropriate.

ATTRITION (ACADEMIC) - Elimination from training resulting from inability or unwillingness to achieve the Learning Objectives of a course. Elimination from training must be based on the recommendation of an Academic Board and approved by higher authority.

ATTRITION (NON-ACADEMIC) - Elimination from training for reasons other than failure to achieve the Learning Objectives of the course.

COURSE EVALUATION (EXTERNAL) - Evaluation of the degree of success of course graduates at whatever point they may be in the training pipeline or on the job.

COURSE EVALUATION (INTERNAL) - Evaluation of the effectiveness and efficiency with which a course is presented, its students' progress measured, and its subject-matter content kept current/relevant.

COURSE REVIEW - A review of a course conducted annually to ensure that Learning Objectives are based on Task Analysis; that accurate and appropriate criterion measures are provided; that effective use is made of student test data; and that efficient and effective supervisory support is provided.

PREVENTIVE COUNSELLING - A student-instructor/learning supervisor interaction designed to help the student to solve a variety of problems which may be or could become deterrents to his success in a learning situation.

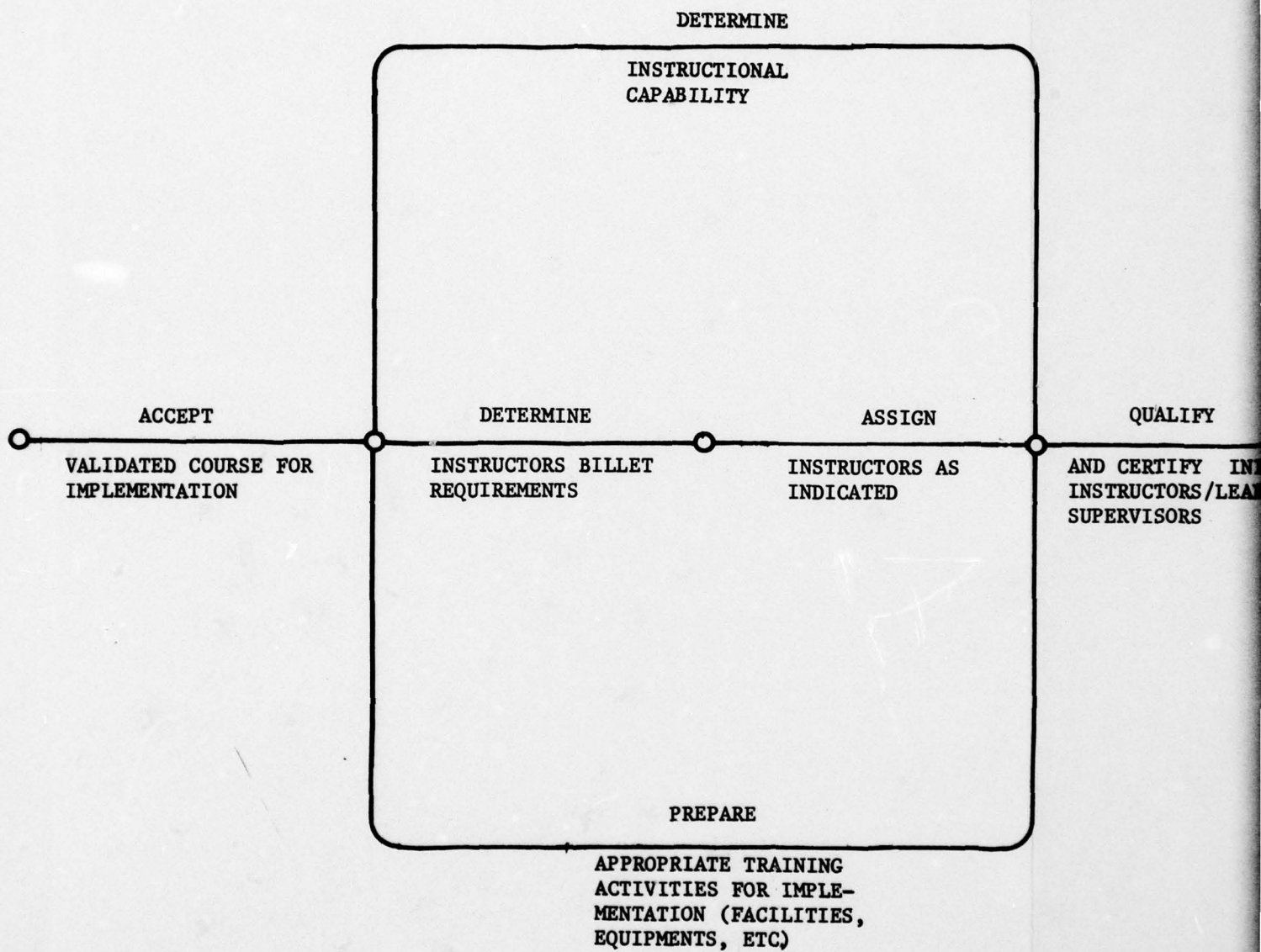
REMEDIAL INSTRUCTION - Planned instruction for remedial purposes conducted outside normal training hours.

REMEDIAL PROGRAM (GROUP-PACED COURSES) - A Remedial Programmed Instruction booklet (P.I.) developed in branching format to be used for student remediation covering the Learning Objectives tested by a criterion test.

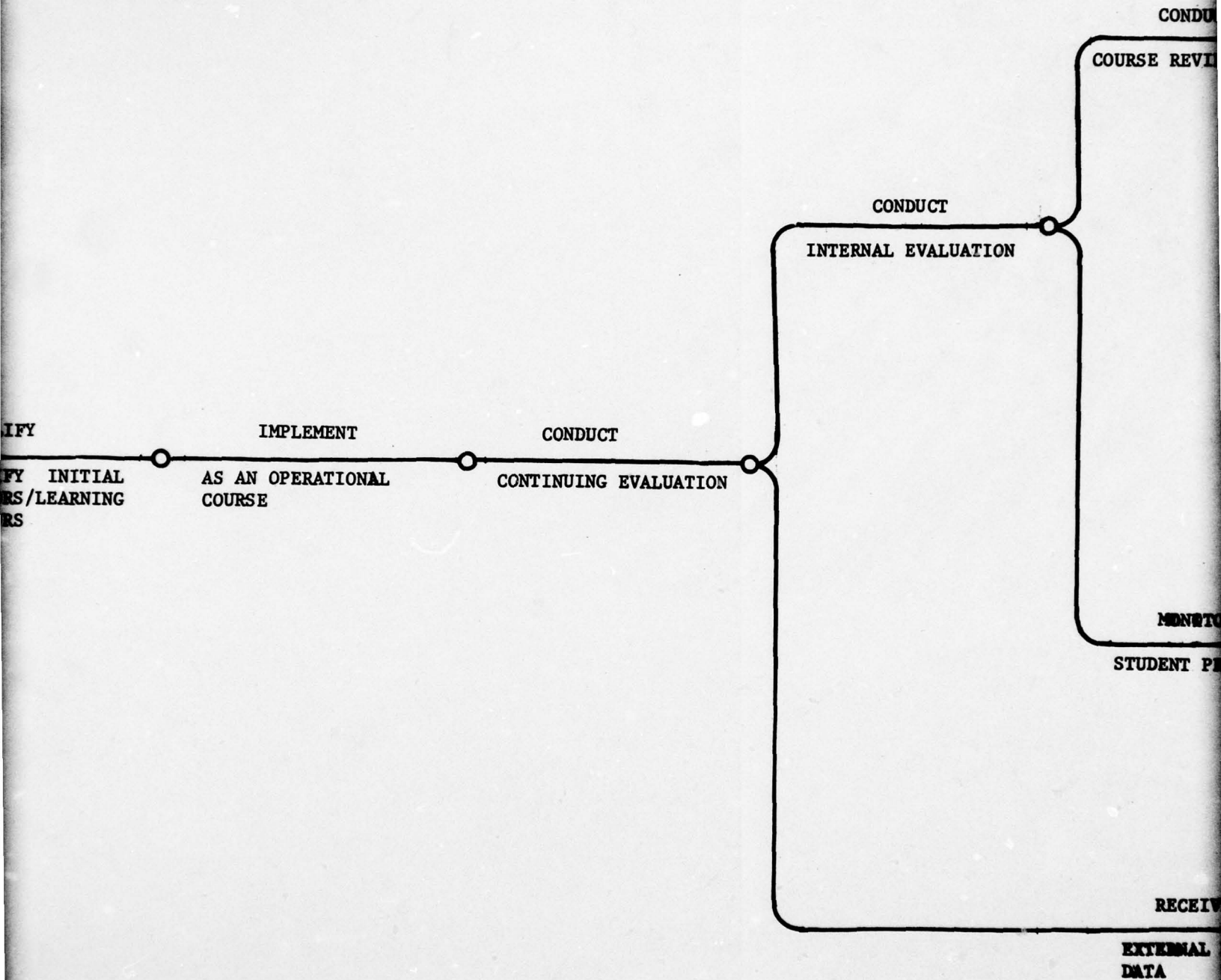
SETBACK (ACADEMIC) - An extension of training time for academic reasons; academic setbacks can be recommended by an Academic Board when a student has failed both a criterion test and the retake of a supplementary criterion test after receiving remediation.

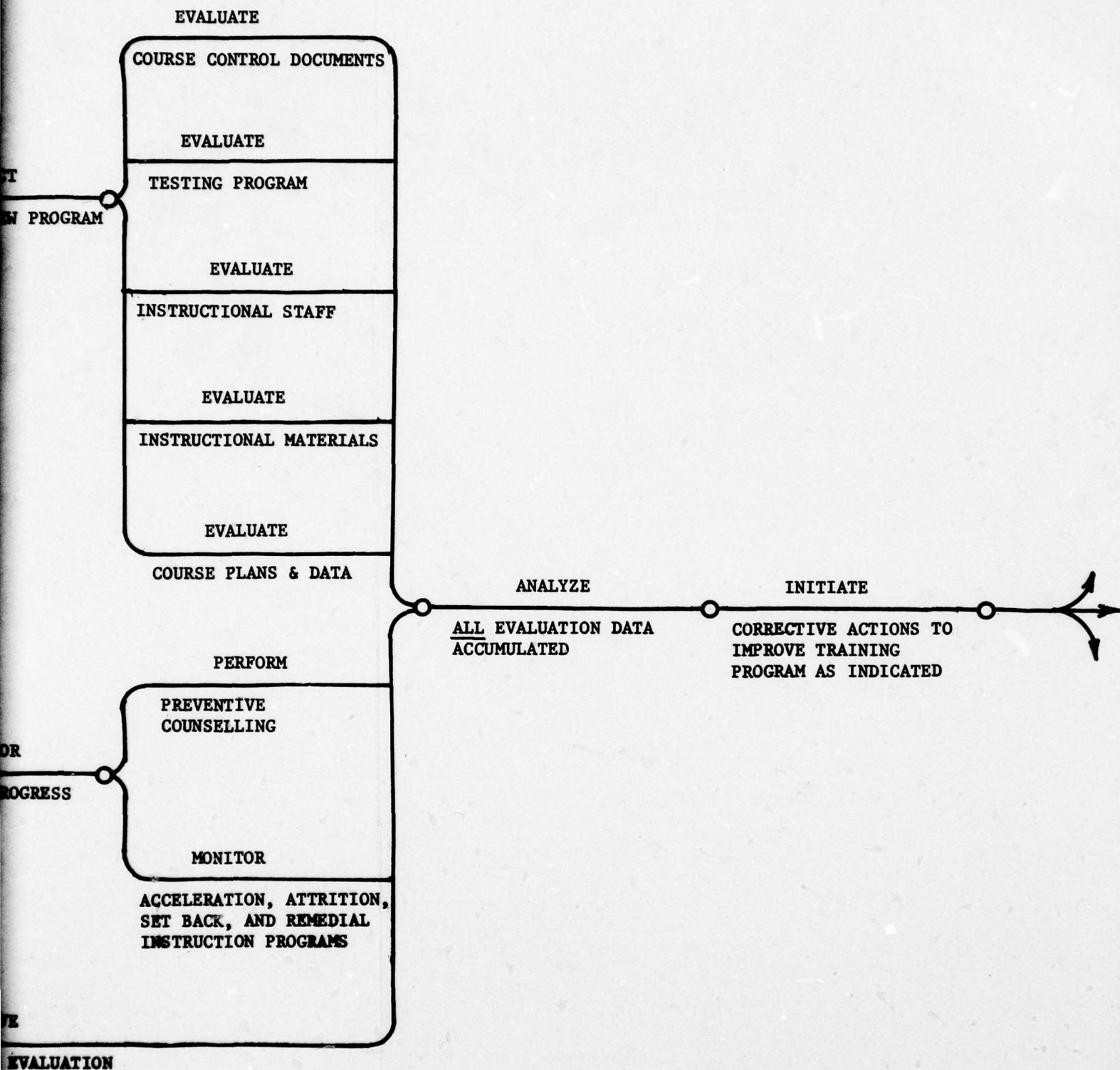
SETBACK (NON-ACADEMIC) - An extension of training time for non-academic reasons granted at the discretion of the Training Officer.

STRONG VOCATIONAL INTEREST INVENTORY - A standardized aptitude inventory used to identify personnel who possess prerequisite qualities suitable for counsellors.



MANAGEMENT





APPENDIX A

1.0 NAVAL OCCUPATIONAL TASK ANALYSIS PROGRAM (NOTAP)

Research has been conducted to determine the best methods of collecting occupational information concerning the utilization of Naval personnel. As a result, a multi-purpose Task Analysis Program for enlisted ratings which has not been available in the past has been designed to provide the Navy with the methods and techniques for determining the validity of requirements for job skills and knowledge.

A Systems Approach to the design and development of instructional programs required two major analytical processes:

1. Job Task Analysis
2. Training Task Analysis

The Naval Occupational Task Analysis Program (NOTAP) is a Navy-wide program that is primarily concerned with the Job Task Analysis process. Training Task Analysis is presently being performed by Naval training activities, using NOTAP Job Task Analysis computer printouts for assistance in the analysis process.

This chapter provides an introduction to NOTAP, indicates data available from NOTAP in the form of computer printouts and addresses the interpretation of the NOTAP printouts in terms of their use in the design and development of instructional programs. This makes it possible for NOTAP data to be utilized in the most effective manner for training purposes.

1.1 NOTAP COMPUTER PRINTOUTS

A Glossary of NOTAP Job Task Analysis Terms is included for reference during the discussion that follows concerning the computer printouts and the procedural application of the data provided in these printouts to Naval training.

1.1.1 HIERARCHICAL TASK/TIME SIMILARITY MATRIX PRINTOUT

The Hierarchical Task/Time Similarity Matrix Printout consists of two parts, the Group Overlap Printout, Figure A-8, and the Hierarchical Time or Task Similarity Matrix Diagram. The Group Overlap Printout identifies which cases merge at each clustering stage, and is the mathematical representation of the Hierarchical Time or Task Similarity Matrix Diagram. The job description developed for each job incumbent in the survey can be compared to every other job description in the survey and the computer can group the cases mathematically on the basis of similarity of time spent performing like tasks.

The computer can also compare job descriptions of all job incumbents in the survey on the basis of like tasks responded to without regard to time spent performing. The computer can then print either the Hierarchical Time Similarity Matrix Diagram or the Hierarchical Task Similarity Matrix Diagram either of which graphically displays stages where a minimum number of incumbents are grouped. The size of groups displayed is determined by the programmer and usually has less than 10 members per group.

The Hierarchical Time Similarity Matrix Diagram displays job relationships. It depicts a "tree-like" structure of the merging clusters and is useful for an overview of how jobs are combined. From this diagram a general assessment of the degree of homogeneity (the degree of similarity, particularly of time spent performing like tasks by groups) among jobs and groups of jobs can be obtained.

The Diagram can be presented in two formats and is requested from NOTAP in either or both of the two formats:

1. Hierarchical Task Similarity Matrix Diagram
2. Hierarchical Time Similarity Matrix Diagram

The former groups and displays the rating surveyed based on a task performance similarity and the latter groups and displays the rating based on time spent performing like tasks similarity. The two Diagrams differ only slightly in composition since groupings of personnel by the time spent performing like tasks or grouping them by the performance of similar numbers of like tasks will produce groups with approximately the same individuals identified in each.

GLOSSARY OF NOTAP JOB ANALYSIS TERMS

Average-between: The average percentage of overlap (similarity of work) between all possible pairings of members in Group A (which may be a one-member group) with members in Group B (which may be a one-member group).

Average-within: The average amount of similar work performed by all members within a given group.

Background data: Personal information, such as name, grade, base, months in service, educational level, skills such as typing, etc. Background data also may be opinions such as answers to questions like: do you plan to re-enlist? Is your job interesting or dull?

Best: A term designating the largest (if maximizing) or smallest (if minimizing) average-between value for two groups combining at a given stage in a clustering process. Essentially, it indicates the similarity (overlap) of the groups which have caused them to combine. (Also see definition of Average-between.)

Case: One man in a survey.

Case ID: An external identification, such as service number, assigned to the incumbent answering a questionnaire (survey) booklet.

Case number: An internal sequence number assigned by program Input Standard (INPSTD) to each survey booklet as it is processed. These numbers eventually become the numbers referenced in the "group sequence hierarchy" so that cases may be extracted from a history file.

Cluster: Cases in a survey that were grouped because specific overlap and grouping functions were selected by the analyst; the number of common tasks performed, or the average amount of time spent on all tasks in their jobs are examples of grouping functions. Also spoken of as a "group".

Characteristics: Selected items of background data, usually describing personal attributes, such as in "worker characteristics".

Compactness: The average overlap of all members of a group to the job description for that group, measuring the amount of time perfectly described; the larger the compactness value, the more closely the description represents the average job description for the cluster of which a case is a member.

CODAP/370: The name of the set of computer programs to perform occupational data analysis on an IBM 370.

Difference: The dissimilarity of cases or clusters with respect to tasks or background data; such information may clarify distinctions between specialty or skill-level groups, with differing experience or training. (At times, job types that have been identified may show superficial similarities until differences are highlighted.)

Distribution: An array of cases spread over a range of some background characteristic or other variable according to the frequency of occurrence; for example: the number who find a job interesting, so-so, or dull.

Duty: A duty normally exists in one functional area and occupies a principal portion of a billet incumbent's work time, occurs frequently in the work cycle, and involves work requiring closely related skills and knowledges.

Group: A cluster; a discrete but sometimes arbitrary formation of members according to some evaluating process such as primary response data, or secondary factor data, or background data.

Group Sequence: The arrangement of case numbers in a sequence such that members in discrete groups are listed sequentially. Also called "hierarchy sequence."

Group Stage: A numbered event in the clustering process at which a case or previously formed group of cases is combined with the group which is most similar to it, the result forming a new, larger composite group containing all members of the two original groups.

Grouping: The union of cases at successive stages into fewer and fewer mutually exclusive job groups, according to some characteristic of homogeneity. For job analysis, the homogeneity usually is the amount of "overlap" of similar work. Also called "clustering".

Hierarchy: The orderly classification of mutually exclusive clusters. Each larger cluster is a unique combination of a group of subordinate clusters.

History data: All the information pertaining to a particular survey.

History Variable: An item of background data; as distinguished from response (work) information. History variables are identified as Vxxx on the History Data File (HDF).

Homogeneity: The degree of similarity, particularly of the work performed by groups. The larger the homogeneity value, the more similar are the jobs of the group members. Also called "similarity".

Incumbent: An individual assigned to a billet representing a particular job.

Inventory: A detailed list of all duties and tasks that can be performed in a particular job category; usually compiled by the team conducting the interview and observation phase of the data-gathering process prior to the construction of the Job Task Inventory Questionnaire.

Job Description: A list of specific tasks (or duty summaries) performed by a selected membership, together with the percentage of time spent performing each task and percentage of members performing each task. Different kinds of job descriptions are:

Group job description: The work descriptions of the members of a group formed during the clustering process are consolidated into an average job description for the group. Such descriptions may be "major job types" or "sub-clusters" or "jobs".

Special job descriptions: The work description of people who are grouped according to similarity of background data and without respect to work performed. Such descriptions describe the work performed by specific people (such as those with a certain length of service, or those with a certain paygrade) and are contrasted with Group Descriptions in which specific work determines the membership of a group.

Combination job descriptions: The composite is formed from cases selected for specific backgrounds within a previous hierarchically formed cluster. This is thus a combination of both Group and Special Job Descriptions. The resultant description is based on both task homogeneity and membership background attributes. For example, within an identified warehouseman job cluster those with a given paygrade or prior schooling may be further extracted for formulation of a job description.

Individual job descriptions: The work performed by a single case, that is selected for review.

Job Task Inventory Questionnaire: The list of background questions to be answered and tasks to be responded to by selected members in a survey. The resulting "answer sheets" are computer-processed and the total data preserved in the NOTAP data bank.

Matrix: An array of quantities in a prescribed form; in CODAP/370 the most common matrices are the "time overlap" and "task overlap" in which up to 2000 cases are compared. Each matrix element represents the homogeneity of two cases.

Matrix Identification: The nomenclature TIME or TASK applied to an overlap matrix to distinguish which type of similarity comparison was made.

Maximizing: The consideration in grouping in which the decision on which cases to combine depends upon the greatest amount of homogeneity in the resulting composite.

Minimizing: The consideration in grouping in which the decision on which cases to combine depends upon the least amount of homogeneity in the resulting composite.

Mutually Exclusive: Cannot both occur together; a process of choice such that if one event in a pair occurs then the other cannot; in clustering, a case that combines to form a new composite is then considered deleted as a discrete case and cannot combine on the same level with another composite. In task analysis, a case that indicates he does not perform a given task element should not subsequently respond that he performs a task which contains the task element.

Order: Arrangement according to some rationale, such as hierarchy order or sort order.

Overlap: The extent (as a percentage) that work performed by one case or group is similar to that performed by another. Usually computed as (1) % time spent performing common tasks; or (2) % of common tasks performed (time excluded).

Primary data: The task time and involvement and worker characteristic response data from a survey.

Relative time: The percentage of total time an incumbent performs on each task in an inventory, computed by converting a "scale" into a distribution over the individual's task performed. The sum of a-1 relative time is 100%.

Report ID: A 7- or 8-character distinguishing identification given to discrete reports generated by the computer; usually the letters "SP" in the ID indicate a "special" attribute attached to the members reported upon, and the letters "GP" indicate the members were part of a cluster formed by the automatic clustering process.

Response: The task answers from a questionnaire, or answers to background questions.

Scale: A numeric range by which some items on the questionnaire are responded to such as to register an incumbent's time performing on a relative basis. Example:
0 = not performed; 1 = performed well below average amount;
4 = average time spent performing; 7 = well above average time spent performing.

Secondary factor: Supplemental data which is derived from primary response data.

Similarity: Homogeneity, likeness of some attribute.

Survey identification: An 8-character unique number assigned to all data in a survey in order to avoid mixing of data; a program checks each file to ensure that the data to be processed corresponds to the survey desired.

Survey: The process of observing a work area and the incumbents, compiling and administering a Job Task Inventory Questionnaire.

TASK Matrix: The overlap matrix formed by computing the similarity of each case to all others on the basis of common tasks performed, without regard to percent time spent performing.

Task: A task is a unit of work that forms a significant part of a duty. Tasks which constitute a duty are not necessarily homogeneous.

Task Element: A task element is a sub-division of a task. It is the smallest unit of work contained in the job that is considered in Job Task Analysis.

TIME Matrix: The overlap matrix formed by computing the pair-wise similarity of individuals according to the common amount of time spent performing like tasks.

Titles: Descriptive statements of variables or duties or tasks.

Variable: A quantity that can assume any of a given set of values. Sometimes referred to as "interval".

GROUP MEMBERSHIP AT 2000 ROAD TO HAITIAN
.....NINE MEMBERS AT EACH BRANCH OF THE PROTECTOR GROUP INC STUDYANOTHER GROUP FORMED IN NEW ORLEANS, CALLED "H.C.S."
PAGE

COMBINING GROUPS									
GROUP	NO.	SEQUENCE	AVERAGE	STAGE	IDENT	NO.	STAGE	FROM	TO
105	348	2	25	26	75.28	87.64	1102	176	1
106	348	2	215	216	75.55	87.77	215	215	25
107	348	2	162	163	75.60	87.80	1102	182	182
108	348	2	184	188	75.66	87.81	1102	184	187
109	348	2	169	191	75.78	87.95	1102	189	189
110	348	2	1075	1276	75.28	82.14	1102	1875	1275
111	348	2	177	181	75.64	82.52	1102	187	177
112	348	2	146	148	76.58	85.12	1102	182	147
113	348	2	218	219	77.32	85.66	1102	182	182
114	348	2	828	816	77.65	86.18	1102	182	182
115	348	2	174	191	77.66	84.17	1102	182	182
116	348	2	977	973	77.71	84.26	1102	182	182
117	348	2	143	146	77.90	83.95	1102	182	182
118	348	2	100	101	78.55	89.28	1102	182	182
119	348	2	178	180	79.27	86.76	1102	182	182
120	348	2	147	148	79.56	87.23	1102	182	182
121	348	2	104	107	80.97	86.23	1102	182	182
122	348	2	100	101	80.97	86.23	1102	182	182
123	348	2	100	101	80.97	86.23	1102	182	182
124	348	2	100	101	80.97	86.23	1102	182	182
125	348	2	100	101	80.97	86.23	1102	182	182
126	348	2	100	101	80.97	86.23	1102	182	182
127	348	2	100	101	80.97	86.23	1102	182	182
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129	348	2	100	101	80.97	86.23	1102	182	182
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131	348	2	100	101	80.97	86.23	1102	182	182
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133	348	2	100	101	80.97	86.23	1102	182	182
134	348	2	100	101	80.97	86.23	1102	182	182
135	348	2	100	101	80.97	86.23	1102	182	182
136	348	2	100	101	80.97	86.23	1102	182	182
137	348	2	100	101	80.97	86.23	1102	182	182
138	348	2	100	101	80.97	86.23	1102	182	182
139	348	2	100	101	80.97	86.23	1102	182	182
140	348	2	100	101	80.97	86.23	1102	182	182
141	348	2	100	101	80.97	86.23	1102	182	182
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149	348	2	100	101	80.97	86.23	1102	182	182
150	348	2	100	101	80.97	86.23	1102	182	182
151	348	2	100	101	80.97	86.23	1102	182	182
152	348	2	100	101	80.97	86.23	1102	182	182
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165	348	2	100	101	80.97	86.23	1102	182	182
166	348	2	100	101	80.97	86.23	1102	182	182
167	348	2	100	101	80.97	86.23	1102	182	182
168	348	2	100	101	80.97	86.23	1102	182	182
169	348	2	100	101	80.97	86.23	1102	182	182
170	348	2	100	101	80.97	86.23	1102	182	182
171	348	2	100	101	80.97	86.23	1102	182	182
172	348	2	100	101	80.97	86.23	1102	182	182
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184	348	2	100	101	80.97	86.23	1102	182	182
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186	348	2	100	101	80.97	86.23	1102	182	182
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193	348	2	100	101	80.97	86.23	1102	182	182
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220	348	2	100	101	80.97	86.23	1102	182	182
221	348	2	100	101	80.97	86.23	1102	182	182
222	348	2	100	101	80.97	86.23	1102	182	182
223	348	2	100	101	80.97	86.23	1102	182	182
224	348	2	100	101	80.97	86.23	1102	182	182
225	348	2	100	101	80.97	86.23	1102	182	182
226	348	2	100	101	80.97	86.23	1102	182	182
227	348	2	100	101	80.97	86.23	1102	182	182
228	348	2	100	101	80.97	86.23	1102	182	182
229	348	2	100	101	80.97	86.23	1102	182	182
230	348	2	100	101	80.97	86.23	1102	182	182
231	348	2	100	101	80.97	86.23	1102	182	182
232	348	2	100	101	80.97	86.23	1102	182	182
233	348	2	100	101	80.97	86.23	1102	182	182
234	348	2	100	101	80.97	86.23	1102	182	182
235	348	2	100	101	80.97	86.23	1102	182	182
236	348	2	100	101	80.97	86.23	1102	182	182
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241	348	2	100	101	80.97	86.23	1102	182	182
242	348	2	100	101	80.97	86.23	1102	182	182
243	348	2	100	101	80.97	86.23	1102	182	182
244	348	2	100	101	80.97	86.23	1102	182	182
245	348	2	100	101	80.97	86.23	1102	182	182
246	348	2	100						

FIGURE A-8 GROUP OVERLAP PRINTOUT

A-8

On the Diagram, grouping stages (clusters) are connected by vertical bars and horizontal lines, and are printed in multi-page columns which are joined edgewise by aligning the horizontal lines. When completely assembled in viewable form, the diagram can easily cover several square yards of display area.

The Diagram (task and/or time) enables the Task Analysis Team member to examine a group or stage; identify case composition and measure the stage's degree of similarity. Workers seldom perform identically, thus similarity degrades as additional dissimilar workers (in stages) are merged to form new stages. At some point, the team member decides which stages still have enough similarity to represent major job types or sub-clusters of job types.

At each merging stage, the diagram indicates the similarity value which caused this specific union, and the average percent overlap of members within the resulting stage. The larger this percentage (called average-within) the more similar are the various individual jobs of the members of the stage. Figure A-10 illustrates a stage notation extracted from the Hierarchical Time Similarity Matrix Diagram for the NOTAP survey of the Aviation Support Equipment Technician (AS) Rating. A reduced size copy of the complete Hierarchical Time Similarity Matrix Diagram is provided as Figure A-60 and will be utilized as the vehicle for this chapter.

1.1.1.1 Analysis Uses for Training. By presentation of similar tasks or time involvement graphically, the Diagram permits the team member to select the most useful descriptions wherever major selected stages are formed. Initially, this will be at any point where:

1. stages merge.
2. separate areas are portrayed, and,
3. many branches are apparent prior to a merge at a stage.

Comparison of stages may be made on:

1. the number of tasks which account for 50%, or 80%, or 100% of the work time, or,
2. training required to perform the tasks associated in a stage, or,
3. the required educational level, or,
4. job satisfaction - or backgrounds.

Any number of attributes may be examined for specific stages. The jobs, identified on the Diagram are analyzed with additional computer printouts by the team members, and are used to:

1. determine training environment based on technical complexity of each job.
2. sequence training content for the conceptual framework of the occupational training pipeline.
3. indicate the modules and units for course(s) to be developed, based on the jobs for which the students will be trained.

STAGE NUMBER → 95

137 ← NUMBER OF CASES
INCLUDED IN THIS STAGE

CONSECUTIVE CASES IN STAGE 1 - 137

AVERAGE PERCENT OF
SIMILARITY BETWEEN
MERGING STAGES
106 AND 114

29.1%

AVERAGE PERCENT OF
SIMILARITY WITHIN
STAGE 95

40.3%

FIGURE A-10, STAGE 95 OF THE AS RATING TIME SIMILARITY MATRIX DIAGRAM

1.1.2 PRINT VARIABLE (PRTVAR)

To this point the Diagram has assisted with the identification of the stages which must be examined. When used in conjunction with the Print Variable (PRTVAR) printout, a greater degree of meaning can be derived from the Diagram. The Print Variable is a computer printout which provides selected history and/or background data for each case in a given sequence. All members (cases) of a given stage (group) are printed sequentially so that their actual data variables can be inspected for similarity. The PRTVAR is a useful analytical tool which permits ready determination of commonality in the background information. Unless otherwise requested, the standard PRTVAR will list standard history or background data common to any occupational area. In some cases, the team members may request a special PRTVAR for certain variables (i.e., billet title, sex, schools attended, etc.,) that are important or may be required for the analysis effort.

Figure A-12 is two pages extracted from a PRTVAR. This figure shows the background and personal information for thirty cases (No.'s 18 thru 47) in Stage 667 of a Time Similarity Matrix Diagram. The column of numbers under each block heading are background and personal information data. The headings of columns of numbers are abbreviations for these items from the Job Task Inventory Questionnaire Response Booklet. As an example, case (individual) No. 23 is serving aboard the ship or station indicated by the activity code (column 1), is in the ASE rating (column 5) in paygrade 5 (column 12), and had 3 years 7 months in the U. S. Navy (column 13), had 2 years 10 months served in his present activity (column 15), and has been in his paygrade for 9 months (column 16) at the time of the survey. Additionally, he had 0000/0000 as his primary and secondary NEC's and responded to the Job Title "Work Center Supervisor".

1.1.2.1 Analysis Use for Training. By utilizing data from the PRTVAR and the graphic display of the Diagram, the team member can now give tentative titles to the stages or groupings. Pay grades and duty titles are apparent. For example, groups of individuals in pay grades 2 and 3 who indicate a common NEC with a high degree of homogeneity are candidates for designation as workers (500 labor) in a given work area. Higher paygrade personnel of various NEC's may be identified as supervisors and managers.

1.1.3 TITLES

The Titles Printout is a double-column listing of all duty and task titles for the rating alpha-numerically presented. Figure A-14 is a page extracted from a Titles Printout. Duties for a rating are coded alphabetically with the tasks listed numerically under each duty category. The Titles Printout serves as a reference list giving the nomenclature of each task response.

1.1.3.1 Analysis Use for Training. This list of titles provides a ready reference for the team member engaged in the task analysis process.

PRINT VAR FOR AS TIME DIAGRAM. COLUMN HEADINGS ARE EQUAL TO
BLOCK NUMBERS ON PAGES 1 AND 2 OF RESPONSE BOOKLET

HIER	1	5	12	13	15	16	20/21	33
1	1452048400	ASE	5	0301	0204	0007	00000000	13
2	1452048400	ASE	4	0206	0108	0102	00000000	13
3	1452048400	ASE	5	0307	0210	0009	00000000	06
4	1452048400	ASE	5	0311	0106	0105	00000000	16
5	1452048400	ASE	4	0108	0011	0006	00000000	13
6	1452048400	ASE	4	0110	0102	0102	00000000	13
7	1452048400	ASE	4	0200	0106	0106	00000000	03
8	1452048400	ASE	4	0205	0110	0010	00000000	13
9	1452048400	ASE	4	0202	0103	0006	00000000	13
10	1452048400	ASE	5	0304	0206	0011	00000000	13
11	1452048400	ASE	5	0301	0204	0007	00000000	13
12	1452048400	ASE	4	0206	0108	0102	00000000	13
13	1452048400	ASE	5	0307	0210	0009	00000000	06
14	1452048400	ASE	5	0311	0106	0105	00000000	16
15	1452048400	ASE	4	0108	0011	0006	00000000	13
16	1452048400	ASE	4	0110	0102	0102	00000000	13
17	1452048400	ASE	4	0200	0106	0106	00000000	03
18	1452048400	ASE	4	0205	0110	0010	00000000	13
19	1452048400	ASE	4	0202	0103	0006	00000000	13
20	1452048400	ASE	5	0304	0206	0011	00000000	13
21	1452048400	ASE	5	0301	0204	0007	00000000	13
22	1452048400	ASE	4	0206	0108	0102	00000000	13
23	1452048400	ASE	5	0307	0210	0009	00000000	06
24	1452048400	ASE	5	0311	0106	0105	00000000	16
25	1452048400	ASE	4	0108	0011	0006	00000000	13
26	1452048400	ASE	4	0110	0102	0102	00000000	13
27	1452048400	ASE	4	0200	0106	0106	00000000	03
28	1452048400	ASE	4	0205	0110	0010	00000000	13
29	1452048400	ASE	4	0202	0103	0006	00000000	13
30	1452048400	ASE	5	0304	0206	0011	00000000	13

BLOCK

1. Ship or station activity code
5. Rating
12. My paygrade
13. Amount of time served in U.S. Navy (years/months)
15. Amount of time served in my present activity (years/months)
16. Amount of time served in my present pay grade (years/months)
- 20/21. My primary and secondary NEC
33. My job title.

Job Titles cited by members (18-47) in stage 667

- 03 Production control P.O. 1 ea
- 04 Training P.O. 1 ea
- 06 Work center supervisor 4 ea
- 13 Electric Shop 500 laborer 23 ea
- 16 Night check supervisor 1 ea

FIGURE A-12, Page 1 PRINT VARIABLE PRINTOUT

A-12

AS TIME PRVTR

MIER SEQ	1	5	12	13	15	16	20/21	33
31	1452032500	ASE	5	0311	0102	0010		13
32	1452037500	ASE	4	0109	0100	0004	00000000	13
33	1452037500	ASE	4	0109	0100	0004	00000000	13
34	1452037500	ASE	5	0311	0305	0102	00000000	06
35	1452054000	ASE	5	0307	0302	0106	00000000	13
36	1452054000	ASE	5	0304	0205	0007	00000000	13
37	1452050800	ASE	5	0305	0209	0008	00000000	13
38	1452066000	ASE	5	0509	0100	0200	00000000	06
39	1452037000	ASE	5	0305	0203	0009	00000000	06
40	1452053400	ASE	5	0601	0200	0403	00000000	13
41	1452065900	ASE	4	0206	0111	0011	00000000	13
42	1452065900	ASE	5	0210	0202	0001	00000000	13
43	1452077300	ASE	3	0100	0005	0008	00000000	13
44	1452048400	ASE	5	0208	0110	0004	00000000	13
45	1452048400	ASE	3	0201	0101	0105	00000000	13
46	1452048400	ASE	5	0504	0100	0307	00000000	13
47	0405006700	ASE	5	0300	0005	0008	00000000	13
48	1452037500	ASE	5	0307	0009	0105	00000000	13
49	1452037500	ASE	4	0109	0100	0004	00000000	13
50	1452037500	ASE	5	0307	0009	0105	00000000	13
51	0405006700	ASE	5	0300	0005	0008	00000000	13
52	1452037500	ASE	5	0307	0009	0105	00000000	13
53	1452037500	ASE	5	0307	0009	0105	00000000	13
54	1452037500	ASE	5	0307	0009	0105	00000000	13
55	1452037500	ASE	5	0307	0009	0105	00000000	13
56	1452037500	ASE	5	0307	0009	0105	00000000	13
57	1452037500	ASE	5	0307	0009	0105	00000000	13
58	1452037500	ASE	5	0307	0009	0105	00000000	13
59	1452037500	ASE	5	0307	0009	0105	00000000	13
60	1452037500	ASE	5	0307	0009	0105	00000000	13
61	1452037500	ASE	5	0307	0009	0105	00000000	13
62	1452037500	ASE	5	0307	0009	0105	00000000	13
63	1452037500	ASE	5	0307	0009	0105	00000000	13
64	1452037500	ASE	5	0307	0009	0105	00000000	13
65	1452037500	ASE	5	0307	0009	0105	00000000	13
66	1452037500	ASE	5	0307	0009	0105	00000000	13
67	1452037500	ASE	5	0307	0009	0105	00000000	13
68	1452037500	ASE	5	0307	0009	0105	00000000	13
69	1452037500	ASE	5	0307	0009	0105	00000000	13
70	1452037500	ASE	5	0307	0009	0105	00000000	13
71	1452037500	ASE	5	0307	0009	0105	00000000	13
72	1452037500	ASE	5	0307	0009	0105	00000000	13
73	1452037500	ASE	5	0307	0009	0105	00000000	13
74	1452037500	ASE	5	0307	0009	0105	00000000	13
75	1452037500	ASE	5	0307	0009	0105	00000000	13
76	1452037500	ASE	5	0307	0009	0105	00000000	13
77	1452037500	ASE	5	0307	0009	0105	00000000	13
78	1452037500	ASE	5	0307	0009	0105	00000000	13
79	1452037500	ASE	5	0307	0009	0105	00000000	13
80	1452037500	ASE	5	0307	0009	0105	00000000	13
81	1452037500	ASE	5	0307	0009	0105	00000000	13
82	1452037500	ASE	5	0307	0009	0105	00000000	13
83	1452037500	ASE	5	0307	0009	0105	00000000	13
84	1452037500	ASE	5	0307	0009	0105	00000000	13
85	1452037500	ASE	5	0307	0009	0105	00000000	13
86	1452037500	ASE	5	0307	0009	0105	00000000	13
87	1452037500	ASE	5	0307	0009	0105	00000000	13
88	1452037500	ASE	5	0307	0009	0105	00000000	13
89	1452037500	ASE	5	0307	0009	0105	00000000	13
90	1452037500	ASE	5	0307	0009	0105	00000000	13
91	1452037500	ASE	5	0307	0009	0105	00000000	13
92	1452037500	ASE	5	0307	0009	0105	00000000	13
93	1452037500	ASE	5	0307	0009	0105	00000000	13
94	1452037500	ASE	5	0307	0009	0105	00000000	13
95	1452037500	ASE	5	0307	0009	0105	00000000	13
96	1452037500	ASE	5	0307	0009	0105	00000000	13
97	1452037500	ASE	5	0307	0009	0105	00000000	13
98	1452037500	ASE	5	0307	0009	0105	00000000	13
99	1452037500	ASE	5	0307	0009	0105	00000000	13
100	1452037500	ASE	5	0307	0009	0105	00000000	13

FIGURE A-12, Page 2 A-13

THIS IS A LIST OF DUTY AREAS OF THE AVIATION GROUND SUPPORT TECHNICIAN THAT INCLUDES ALL DUTIES BY FUNCTIONAL AREA OF TASKS PERFORMED GENERAL RATING "AS" AND THE THREE SERVICE RATINGS OF "ASH", "JSM", AND "ASE"

A---DIRECTING AND IMPLEMENTING	
A 1	ASSIGN WORK PRIORITY
A 2	ASSIGN WORK LOADS
A 3	ENSURE WORK ASSIGNMENTS ARE COMPLETED
A 4	DIRECT (SUPERVISE) WORK IN PROGRESS
A 5	COORDINATE WORKLOAD WITHIN DIVISION
A 6	COUNSEL PERSONNEL CONCERNING MILITARY/PERSONAL MATTERS
A 7	MAKE PERSONNEL ASGMTS. (WORK CENTERS, DY SECTIONS, ETC.)
B---TRAINING	
B 1	CONDUCT FORMAL CLASSROOM/OPERATIONAL TRAINING FOR LICENSING
B 2	SCHEDULE TRAINING
B 3	INSTR. PERS. IN SAFETY PRACIT. PERT TO OPER & MAINT OF GSE
B 4	MAKE/MANUFACTURE TRAINING AIDS
B 5	PROFICAD/SCREEN LESSON GUIDES
B 6	ADMINISTER TESTS/EXAMINATIONS
B 7	GRADE TESTS/EXAMINATIONS
B 8	WRITE LESSON GUIDES
B 9	MAINTAIN TRAINING RECORDS
B 10	PREPARE TRAINING REPORTS
B 11	WRITE TRAINING OUTLINES
B 12	PREPARE TESTS/EXAMINATIONS
B 13	PREPARE TRAINING LECTURES
B 14	WRITE COURSES OF STUDY
B 15	UPDATE TNG MATERIAL/LESSON GUIDES, PLANS, ETC.)
C---SUPPLY	
C 1	SCREEN SUPPLY REQUESTS FOR CORRECTNESS
C 2	DETERMINE PROCUREMENT SOURCE OF PARTS/SUPPLIES (NAVY, OPEN)
C 3	SCREEN PARTS/EQUIPMENT RECEIVED FROM SUPPLY
C 4	FILL OUT SUPPLY REQUISITION FORMS
C 5	FOLLOW UP SUPPLY REQUISITIONS
C 6	PREPARE INVENTORY REPORTS
C 7	UNCRATE EQUIPMENT
C 8	CRATE EQUIPMENT FOR SHIPMENT
C 9	PACKAGE DELICATE EQUIPMENT FOR SHIPMENT
C 10	STOW/BREAK OUT PARTS, SUPPLIES, EQUIPMENT
C 11	ORDER PARTS/SUPPLIES
C 12	ISSUE TOOLS/EQUIPMENT/SUPPLIES
C 13	PICK UP/TURN IN PARTS AND SUPPLIES
C 14	INVENTORY TOOLS/EQUIPMENT/SUPPLIES
C 15	RESEARCH PUBLICATIONS TO OBTAIN SUPPLY DATA
C 16	MAINTAIN PRE-EXPENSED BIN (PEB/FREE BIN)
D---AMSE MAINTENANCE ADMINISTRATION/PRODUCTION CONTROL	
D 1	ORDER OPEN PURCHASE ITEMS
D 2	SCREEN EFFECTIVE COMPONENTS TO DETERMINE REPAIR CAPABILITY
D 3	MAKE SALVAGE RUNS FOR SPARE PARTS
D 4	PLACE IDENTIFYING MARKS ON TOOLS/EQUIPMENT
D 5	DRAFT SURVEYS ON LOST/DAMAGED EQUIPMENT
D 6	COMPLETE/ATTACH EQUIPMENT STATUS TAGS (RFI, NON-RFI, BCM)
D 7	PREPARE AWAITING PARTS (AMP) REPORTS
E---AIRCRAFT SERVICING/PLANE CAPTAIN	
E 1	HIDE AIRCRAFT BRAKES
E 2	PUSH AIRCRAFT
E 3	STRAP PERSONNEL IN AIRCRAFT
E 4	FUEL/OIL AIRCRAFT
E 5	REMOVE/REPLACE AIRCRAFT ACCESS PANELS
E 6	CONNECT EXTERNAL POWER TO AIRCRAFT
E 7	CONNECT AIR CONDITIONER TO AIRCRAFT

FIGURE A-14, TITLES-PRINTOUT A-14

1.1.4 DUTY VARIABLE (DUVAR)

The Duty Variable (DUVAR) Printout, ordered in hierarchy sequence, is used to display an overview of the tasks performed by each case within the survey, and permits the team member to investigate the groupings at various stages on the Diagram.

As shown in Figure A-16, the data printed for each hierarchy sequence number (case) listed (first column on left), is the number of tasks performed by the case (third column). The tasks were compiled for the computer by optical scanning the Job Task Inventory Questionnaire Response Booklet, completed by each member surveyed.

The "Number of Tasks" performed in each duty area is presented in (columns 4-25), as shown in the figure. For example, note that case Number 10 responded to the performance of 57 tasks. Scanning the listed duty areas indicates a high degree of involvement in Duties, S, T, U, and Z. A Duty Variable which can be computed on the average percent of time spent in each duty area is more informative because it indicates the relative amount of time involvement in each duty area.

1.1.4.1 Analysis Use for Training. The sequence numbers in the left column of the DUVAR are assigned by the computer in the same order as group members combined at any given stage, so that they appear together on the printout. Therefore, the cases (members) of any job type are always found within a given input sequence range. The data displayed is extremely useful. For example, it serves to provide an overview of personnel who comprise various stages, and will indicate job areas and jobs in which they are serving.

1.1.5 JOB DESCRIPTION (JOBDEC)

The Job Description (JOBDEC) Printout, with its many variations, is the most widely used printout. It is a list of specific duties and tasks performed by a selected group with the percentage of members performing each task and the percentage of time spent performing each task. It displays the degree of similarity within the group. Standard variations of the job description printout are:

1. Group Job Description
2. Special Job Description
3. Combination Job Description
4. Individual Job Description

1.1.5.1 Group Job Description. A Group Job Description (GRP JOBDEC) selected for a stage on the Diagram, is a printout of the duties and tasks performed by the cases grouped at that stage. The job descriptions of the members of a stage formed during the clustering process are consolidated into an average job description for the group.

NUMBER OF TASKS PERFORMED IN EACH DUTY
RELATES TO PRINT VAR FOR TIME DIAGRAM SHOWS NUMBER OF TASK
PERFORMED IN EACH DUTY AREA

HIER SEQ	CASE ID	TASKS PERFORMED	A	N	M	B	D	C	E	F	P	Z	R	X	U	S	T	Y	K	V	J	L	Q	W
1	23752	70	2	2	2	0	4	1	0	15	7	11	0	5	4	0	6	3	3	1	6	0	0	0
2	31402	98	4	3	1	0	4	3	0	15	6	12	1	8	6	9	8	2	2	3	0	0	2	
3	33113	70	0	2	1	0	2	0	1	12	6	11	1	1	8	6	6	0	0	0	0	0	1	
4	32704	89	6	1	3	0	3	3	0	17	7	14	2	3	4	2	7	0	0	0	0	0	0	
5	30793	103	3	1	0	0	7	3	1	20	8	11	1	4	12	15	12	11	0	1	10	0	1	
6	40522	23	0	1	0	0	0	0	1	0	8	13	1	4	8	11	6	7	3	2	0	0	0	
7	30959	77	1	1	1	0	1	0	0	8	8	4	1	1	10	10	11	1	1	9	0	0	0	
8	30768	77	0	1	0	1	2	0	3	8	4	0	0	0	9	10	4	0	0	1	4	0	0	
9	30788	73	1	1	0	0	2	0	2	14	2	12	0	7	6	10	5	0	0	2	2	0	0	
10	30790	57	0	1	0	1	2	4	0	4	4	12	0	3	5	6	6	2	1	2	4	0	0	
11	30548	73	0	1	0	0	3	0	1	15	0	3	7	8	5	3	1	2	3	1	2	0	0	
12	32613	73	0	1	0	0	2	0	0	10	0	0	0	0	3	9	10	8	0	0	2	7	0	
13	31396	77	0	2	1	0	0	1	0	10	4	7	2	3	1	6	4	0	1	0	0	0	1	
14	31391	71	1	1	0	0	2	0	0	18	3	4	0	0	7	2	5	0	0	0	0	0	2	
15	30334	19	0	1	2	0	0	0	0	0	7	1	7	0	9	9	9	0	0	1	1	0	1	
16	30691	117	1	1	2	0	0	0	0	6	10	2	12	15	16	12	4	0	2	3	0	0	5	
17	30872	111	0	3	1	1	9	7	0	7	6	7	1	13	11	16	12	2	0	1	5	0	3	
18	30735	95	5	1	1	2	5	9	0	7	5	4	1	1	14	19	12	0	0	1	7	1	0	
19	30729	87	3	1	0	2	5	9	0	3	5	6	1	4	15	14	11	0	0	0	7	0	1	
20	32705	89	0	2	4	5	5	4	0	7	5	4	1	2	15	16	10	0	0	0	5	0	0	
21	32666	120	5	4	3	5	10	11	3	2	6	7	3	1	15	18	11	0	0	1	4	5	0	
22	33245	117	1	1	1	7	9	9	0	7	7	1	5	17	17	13	1	2	1	10	1	0	0	
23	32702	86	4	1	2	2	5	2	0	4	4	6	1	0	16	18	12	0	0	0	6	1	0	
24	33115	77	2	1	4	2	4	4	1	6	1	5	1	3	14	17	11	0	0	0	1	0	0	
25	30765	89	0	3	0	0	1	4	0	16	6	11	1	0	18	16	10	0	0	0	3	0	0	
26	30775	94	0	1	0	0	4	7	0	13	5	8	1	4	15	19	12	0	0	2	2	0	1	
27	32659	80	1	2	0	3	2	1	0	4	3	7	0	2	18	19	13	0	0	0	4	0	1	
28	30539	99	2	2	0	0	1	14	0	6	4	9	1	3	17	19	13	0	0	0	7	1	0	
29	31211	77	1	3	1	1	4	5	0	4	9	1	1	10	18	12	0	0	0	0	3	0	0	
30	31439	111	3	5	1	1	6	10	0	9	7	5	1	4	16	18	12	0	0	2	6	2	0	
31	31717	147	1	2	0	0	10	9	1	9	10	15	2	15	19	15	11	5	1	8	10	0	4	
32	32766	97	0	1	0	4	8	5	0	4	5	8	1	7	16	15	12	0	1	1	4	0	1	
33	32767	121	0	4	1	0	12	15	0	5	9	10	0	6	14	19	13	1	0	1	11	0	0	
34	32776	109	5	4	3	1	8	9	0	4	6	10	1	5	14	19	12	0	0	0	8	0	0	
35	31433	115	0	1	0	0	9	11	0	5	6	14	1	8	16	16	10	1	0	0	6	7	0	
36	31455	91	0	2	0	0	7	7	0	4	5	10	1	4	15	16	10	1	0	0	5	0	1	
37	30771	113	3	3	2	2	11	8	0	15	4	7	1	3	19	18	13	0	0	1	3	0	0	
38	31357	98	6	1	3	1	5	7	0	13	6	5	2	3	13	16	8	0	0	1	7	0	0	
39	32742	104	4	3	2	2	0	6	8	0	12	5	9	0	2	14	16	13	0	2	1	8	0	
40	30785	141	4	3	2	2	11	12	0	19	8	14	1	9	12	18	12	7	2	1	2	0	0	
41	31111	115	1	3	1	1	7	12	0	8	7	13	1	2	16	18	9	0	0	1	3	11	1	
42	31166	100	0	3	3	0	7	8	0	8	4	5	1	1	19	17	8	0	0	0	3	12	1	
43	30527	101	0	1	0	0	4	8	0	6	4	5	1	10	17	16	10	0	0	1	7	11	0	
44	32648	102	5	3	1	5	7	9	0	7	7	9	1	6	10	12	10	0	0	1	6	2	0	
45	32849	94	0	4	0	4	9	0	5	7	7	0	9	14	11	11	0	0	0	0	7	1	0	
46	32889	127	5	3	1	5	9	9	0	7	6	9	5	10	17	16	10	0	0	1	6	5	0	
47	35269	141	4	2	2	3	12	12	0	11	6	10	5	7	17	15	10	1	2	2	11	5	1	
48	31262	73	0	1	0	0	4	1	1	3	4	5	5	1	6	14	15	11	0	0	2	1	0	
49	31866	92	1	4	0	0	0	6	9	2	4	7	0	7	18	18	11	0	0	1	0	0	0	
50	32601	80	1	3	1	0	3	5	0	6	5	9	0	1	14	15	10	0	0	1	6	6	0	
51	35158	69	0	2	0	0	9	2	0	2	3	3	0	0	15	10	6	0	0	0	2	2	0	
52	30809	68	4	2	0	1	5	2	0	2	3	3	0	0	15	10	6	0	0	0	2	0	0	

DUTY VARIABLE PRINTOUT
FIGURE A-16
A-16

DUTY VARIABLE PRINTOUT

FIGURE A-16

A-36

1.1.5.2 Special Job Description. The Special Job Description (SP JOBDEC) Printout provides the job description for cases who are grouped according to similarity of background data without respect to work performed. Such descriptions describe the work performed by a defined or specific population, i.e., individuals maintaining specific equipment with six years of Naval service, in paygrade five and filling a certain billet. This printout is contrasted with the group job description in which specific work determines the membership of a group (stage).

1.1.5.3 Combination Job Description. Another variation of the JOBDEC is the Combination Job Description (COB JOBDEC) Printout. The Combination Job Description is a job description for a defined sub-population of a stage grouping. It is formed from cases selected by a specific background variable within a previously formed stage. This printout is a combination of the Group and Special Job Descriptions. The resultant description is based on both task similarity and membership background variable, i.e., a job description of members within a stage who responded to having the billet title of "Arc Welder" as a background variable.

1.1.5.4 Individual Job Description. The Individual Job Description (ID JOBDEC) is a description of work performed by a single case. This printout is used to inspect selected cases, such as cases which become "isolated" in the grouping process - that is, they do not merge into a group until very late because of low similarity. This could be caused by new or different equipment, or work foreign to the general survey group. The Individual Job Description also permits selection of members from stages, for inspection of cases which may represent a "typical worker" in the job.

Normally JOBDEC's are computed for groups from selected stages of the Diagram and by paygrades. Each printout furnishes percentage values based on the following optional forms:

1. Percent of Members, within the stage or group, performing each duty and task,
2. Average percent of time spent per duty and task by performing members,
3. Average percent of time spent by all members, in the group or stage, per duty and task, and
4. Cumulative percent of time together with a count of the number of tasks comprising the cumulative percent time.

The team members may request a JOBDEC based on any one of the first three forms above, or duty/task identifiers, as shown in Figures A-18, A-20, A-22, and A-24.

1.1.5.5 Analysis Use for Training. The JOBDEC printout and its many variations is used frequently by the team member. The options, "percent of members performing each task" and "average percent of time spent by all members in the group per task" are used most frequently. The first displays involvement of the group in tasks as a function of the percentage of the group. The second provides the average percentage of time involved by the group as a whole on each task. This last option has been found to be the most useful since it deals with averages for all members of the group.

AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION OVERLAP STAGE NUMBER

DUTY JOB DESCRIPTION: CASES= 1100-1109-1110-1111-1112-1113-1114-1115-1116-1117-1118-1119-1120-1121-1122-1123-1124-1125-1126-1127-1128-1129-1130-1131-1132-1133-1134-1135-1136-1137-1138-1139-1140-1141-1142-1143-1144-1145-1146-1147-1148-1149-1150-1151-1152-1153-1154-1155-1156-1157-1158-1159-1160-1161-1162-1163-1164-1165-1166-1167-1168-1169-1170-1171-1172-1173-1174-1175-1176-1177-1178-1179-1180-1181-1182-1183-1184-1185-1186-1187-1188-1189-1190-1191-1192-1193-1194-1195-1196-1197-1198-1199-1200-1201-1202-1203-1204-1205-1206-1207-1208-1209-1210-1211-1212-1213-1214-1215-1216-1217-1218-1219-1220-1221-1222-1223-1224-1225-1226-1227-1228-1229-1230-1231-1232-1233-1234-1235-1236-1237-1238-1239-1240-1241-1242-1243-1244-1245-1246-1247-1248-1249-1250-1251-1252-1253-1254-1255-1256-1257-1258-1259-1260-1261-1262-1263-1264-1265-1266-1267-1268-1269-1270-1271-1272-1273-1274-1275-1276-1277-1278-1279-1280-1281-1282-1283-1284-1285-1286-1287-1288-1289-1290-1291-1292-1293-1294-1295-1296-1297-1298-1299-1300-1301-1302-1303-1304-1305-1306-1307-1308-1309-1310-1311-1312-1313-1314-1315-1316-1317-1318-1319-1320-1321-1322-1323-1324-1325-1326-1327-1328-1329-1330-1331-1332-1333-1334-1335-1336-1337-1338-1339-1340-1341-1342-1343-1344-1345-1346-1347-1348-1349-1350-1351-1352-1353-1354-1355-1356-1357-1358-1359-1360-1361-1362-1363-1364-1365-1366-1367-1368-1369-1370-1371-1372-1373-1374-1375-1376-1377-1378-1379-1380-1381-1382-1383-1384-1385-1386-1387-1388-1389-1390-1391-1392-1393-1394-1395-1396-1397-1398-1399-1400-1401-1402-1403-1404-1405-1406-1407-1408-1409-1410-1411-1412-1413-1414-1415-1416-1417-1418-1419-1420-1421-1422-1423-1424-1425-1426-1427-1428-1429-1430-1431-1432-1433-1434-1435-1436-1437-1438-1439-1440-1441-1442-1443-1444-1445-1446-1447-1448-1449-1450-1451-1452-1453-1454-1455-1456-1457-1458-1459-1460-1461-1462-1463-1464-1465-1466-1467-1468-1469-1470-1471-1472-1473-1474-1475-1476-1477-1478-1479-1480-1481-1482-1483-1484-1485-1486-1487-1488-1489-1490-1491-1492-1493-1494-1495-1496-1497-1498-1499-1500-1501-1502-1503-1504-1505-1506-1507-1508-1509-1510-1511-1512-1513-1514-1515-1516-1517-1518-1519-1520-1521-1522-1523-1524-1525-1526-1527-1528-1529-1530-1531-1532-1533-1534-1535-1536-1537-1538-1539-1540-1541-1542-1543-1544-1545-1546-1547-1548-1549-1550-1551-1552-1553-1554-1555-1556-1557-1558-1559-1560-1561-1562-1563-1564-1565-1566-1567-1568-1569-1570-1571-1572-1573-1574-1575-1576-1577-1578-1579-1580-1581-1582-1583-1584-1585-1586-1587-1588-1589-1590-1591-1592-1593-1594-1595-1596-1597-1598-1599-1600-1601-1602-1603-1604-1605-1606-1607-1608-1609-1610-1611-1612-1613-1614-1615-1616-1617-1618-1619-1620-1621-1622-1623-1624-1625-1626-1627-1628-1629-1630-1631-1632-1633-1634-1635-1636-1637-1638-1639-1640-1641-1642-1643-1644-1645-1646-1647-1648-1649-1650-1651-1652-1653-1654-1655-1656-1657-1658-1659-1660-1661-1662-1663-1664-1665-1666-1667-1668-1669-1670-1671-1672-1673-1674-1675-1676-1677-1678-1679-1680-1681-1682-1683-1684-1685-1686-1687-1688-1689-1690-1691-1692-1693-1694-1695-1696-1697-1698-1699-1700-1701-1702-1703-1704-1705-1706-1707-1708-1709-1710-1711-1712-1713-1714-1715-1716-1717-1718-1719-1720-1721-1722-1723-1724-1725-1726-1727-1728-1729-1730-1731-1732-1733-1734-1735-1736-1737-1738-1739-1740-1741-1742-1743-1744-1745-1746-1747-1748-1749-1750-1751-1752-1753-1754-1755-1756-1757-1758-1759-1760-1761-1762-1763-1764-1765-1766-1767-1768-1769-1770-1771-1772-1773-1774-1775-1776-1777-1778-1779-1780-1781-1782-1783-1784-1785-1786-1787-1788-1789-1790-1791-1792-1793-1794-1795-1796-1797-1798-1799-1800-1801-1802-1803-1804-1805-1806-1807-1808-1809-1810-1811-1812-1813-1814-1815-1816-1817-1818-1819-1820-1821-1822-1823-1824-1825-1826-1827-1828-1829-1830-1831-1832-1833-1834-1835-1836-1837-1838-1839-1840-1841-1842-1843-1844-1845-1846-1847-1848-1849-1850-1851-1852-1853-1854-1855-1856-1857-1858-1859-1860-1861-1862-1863-1864-1865-1866-1867-1868-1869-1870-1871-1872-1873-1874-1875-1876-1877-1878-1879-1880-1881-1882-1883-1884-1885-1886-1887-1888-1889-1890-1891-1892-1893-1894-1895-1896-1897-1898-1899-1900-1901-1902-1903-1904-1905-1906-1907-1908-1909-1910-1911-1912-1913-1914-1915-1916-1917-1918-1919-1920-1921-1922-1923-1924-1925-1926-1927-1928-1929-1930-1931-1932-1933-1934-1935-1936-1937-1938-1939-1940-1941-1942-1943-1944-1945-1946-1947-1948-1949-1950-1951-1952-1953-1954-1955-1956-1957-1958-1959-1960-1961-1962-1963-1964-1965-1966-1967-1968-1969-1970-1971-1972-1973-1974-1975-1976-1977-1978-1979-1980-1981-1982-1983-1984-1985-1986-1987-1988-1989-1990-1991-1992-1993-1994-1995-1996-1997-1998-1999-2000-2001-2002-2003-2004-2005-2006-2007-2008-2009-2010-2011-2012-2013-2014-2015-2016-2017-2018-2019-2020-2021-2022-2023-2024-2025-2026-2027-2028-2029-2030-2031-2032-2033-2034-2035-2036-2037-2038-2039-2040-2041-2042-2043-2044-2045-2046-2047-2048-2049-2050-2051-2052-2053-2054-2055-2056-2057-2058-2059-2060-2061-2062-2063-2064-2065-2066-2067-2068-2069-2070-2071-2072-2073-2074-2075-2076-2077-2078-2079-2080-2081-2082-2083-2084-2085-2086-2087-2088-2089-2090-2091-2092-2093-2094-2095-2096-2097-2098-2099-2100-2101-2102-2103-2104-2105-2106-2107-2108-2109-2110-2111-2112-2113-2114-2115-2116-2117-2118-2119-2120-2121-2122-2123-2124-2125-2126-2127-2128-2129-2130-2131-2132-2133-2134-2135-2136-2137-2138-2139-2140-2141-2142-2143-2144-2145-2146-2147-2148-2149-2150-2151-2152-2153-2154-2155-2156-2157-2158-2159-2160-2161-2162-2163-2164-2165-2166-2167-2168-2169-2170-2171-2172-2173-2174-2175-2176-2177-2178-2179-2180-2181-2182-2183-2184-2185-2186-2187-2188-2189-2190-2191-2192-2193-2194-2195-2196-2197-2198-2199-2200-2201-2202-2203-2204-2205-2206-2207-2208-2209-2210-2211-2212-2213-2214-2215-2216-2217-2218-2219-2220-2221-2222-2223-2224-2225-2226-2227-2228-2229-2230-2231-2232-2233-2234-2235-2236-2237-2238-2239-2240-2241-2242-2243-2244-2245-2246-2247-2248-2249-2250-2251-2252-2253-2254-2255-2256-2257-2258-2259-2260-2261-2262-2263-2264-2265-2266-2267-2268-2269-2270-2271-2272-2273-2274-2275-2276-2277-2278-2279-2280-2281-2282-2283-2284-2285-2286-2287-2288-2289-2290-2291-2292-2293-2294-2295-2296-2297-2298-2299-2300-2301-2302-2303-2304-2305-2306-2307-2308-2309-2310-2311-2312-2313-2314-2315-2316-2317-2318-2319-2320-2321-2322-2323-2324-2325-2326-2327-2328-2329-2330-2331-2332-2333-2334-2335-2336-2337-2338-2339-2340-2341-2342-2343-2344-2345-2346-2347-2348-2349-2350-2351-2352-2353-2354-2355-2356-2357-2358-2359-2360-2361-2362-2363-2364-2365-2366-2367-2368-2369-2370-2371-2372-2373-2374-2375-2376-2377-2378-2379-2380-2381-2382-2383-2384-2385-2386-2387-2388-2389-2390-2391-2392-2393-2394-2395-2396-2397-2398-2399-2400-2401-2402-2403-2404-2405-2406-2407-2408-2409-2410-2411-2412-2413-2414-2415-2416-2417-2418-2419-2420-2421-2422-2423-2424-2425-2426-2427-2428-2429-2430-2431-2432-2433-2434-2435-2436-2437-2438-2439-2440-2441-2442-2443-2444-2445-2446-2447-2448-2449-2450-2451-2452-2453-2454-2455-2456-2457-2458-2459-2460-2461-2462-2463-2464-2465-2466-2467-2468-2469-2470-2471-2472-2473-2474-2475-2476-2477-2478-2479-2480-2481-2482-2483-2484-2485-2486-2487-2488-2489-2490-2491-2492-2493-2494-2495-2496-2497-2498-2499-2500-2501-2502-2503-2504-2505-2506-2507-2508-2509-2510-2511-2512-2513-2514-2515-2516-2517-2518-2519-2520-2521-2522-2523-2524-2525-2526-2527-2528-2529-2530-2531-2532-2533-2534-2535-2536-2537-2538-2539-2540-2541-2542-2543-2544-2545-2546-2547-2548-2549-2550-2551-2552-2553-2554-2555-2556-2557-2558-2559-2560-2561-2562-2563-2564-2565-2566-2567-2568-2569-2570-2571-2572-2573-2574-2575-2576-2577-2578-2579-2580-2581-2582-2583-2584-2585-2586-2587-2588-2589-2590-2591-2592-2593-2594-2595-2596-2597-2598-2599-2600-2601-2602-2603-2604-2605-2606-2607-2608-2609-2610-2611-2612-2613-2614-2615-2616-2617-2618-2619-2620-2621-2622-2623-2624-2625-2626-2627-2628-2629-2630-2631-2632-2633-2634-2635-2636-2637-2638-2639-2640-2641-2642-2643-2644-2645-2646-2647-2648-2649-2650-2651-2652-2653-2654-2655-2656-2657-2658-2659-2660-2661-2662-2663-2664-2665-2666-2667-2668-2669-2670-2671-2672-2673-2674-2675-2676-2677-2678-2679-2680-2681-2682-2683-2684-2685-2686-2687-2688-2689-2690-2691-2692-2693-2694-2695-2696-2697-2698-2699-2700-2701-2702-2703-2704-2705-2706-2707-2708-2709-2710-2711-2712-2713-2714-2715-2716-2717-2718-2719-2720-2721-2722-2723-2724-2725-2726-2727-2728-2729-2730-2731-2732-2733-2734-2735-2736-2737-2738-2739-2740-2741-2742-2743-2744-2745-2746-2747-2748-2749-2750-2751-2752-2753-2754-2755-2756-2757-2758-2759-2760-2761-2762-2763-2764-2765-2766-2767-2768-2769-2770-2771-2772-2773-2774-2775-2776-2777-2778-2779-2780-2781-2782-2783-2784-2785-2786-2787-2788-2789-2790-2791-2792-2793-2794-2795-2796-2797-2798-2799-2800-2801-2802-2803-2804-2805-2806-2807-2808-2809-2810-2811-2812-2813-2814-2815-2816-2817-2818-2819-2820-2821-2822-2823-2824-2825-2826-2827-2828-2829-2830-2831-2832-2833-2834-2835-2836-2837-2838-2839-2840-2841-2842-2843-2844-2845-2846-2847-2848-2849-2850-2851-2852-2853-2854-2855-2856-2857-2858-2859-2860-2861-2862-2863-2864-2865-2866-2867-2868-2869-2870-2871-2872-2873-2874-2875-2876-2877-2878-2879-2880-2881-2882-2883-2884-2885-2886-2887-2888-2889-2890-2891-2892-2893-2894-2895-2896-2897-2898-2899-2900-2901-2902-2903-2904-2905-2906-2907-2908-2909-2910-2911-2912-2913-2914-2915-2916-2917-2918-2919-2920-2921-2922-2923-2924-2925-2926-2927-2928-2929-2930-2931-2932-2933-2934-2935-2936-2937-2938-2939-2940-2941-2942-2943-2944-2945-2946-2947-2948-2949-2950-2951-2952-2953-2954-2955-2956-2957-2958-2959-2960-2961-2962-2963-2964-2965-2966-2967-2968-2969-2970-2971-2972-2973-2974-2975-2976-2977-2978-2979-2980-2981-2982-2983-2984-2985-2986-2987-2988-2989-2990-2991-2992-2993-2994-2995-2996-2997-2998-2999-3000-3001-3002-3003-3004-3005-3006-3007-3008-3009-3010-3011-3012-3013-3014-3015-3016-3017-3018-3019-3020-3021-3022-3023-3024-3025-3026-3027-3028-3029-3030-3031-3032-3033-3034-3035-3036-3037-3038-3039-3040-3041-3042-3043-3044-3045-3046-3047-3048-3049-3050-3051-3052-3053-3054-3055-3056-3057-3058-3059-3060-3061-3062-3063-3064-3065-3066-3067-3068-3069-3070-3071-3072-3073-3074-3075-3076-3077-3078-3079-3080-3081-3082-3083-3084-3085-3086-3087-3088-3089-3090-3091-3092-3093-3094-3095-3096-3097-3098-3099-3100-3101-3102-3103-3104-3105-3106-3107-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AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION BY OVERLAP STAGE NUMBER
 CASES= 1108 TASKS= 421 DUTIES= 22 MEMBERS= 89
 SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 104 FORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

ORDERED BY.....		AVERAGE PERCENT TIME SPENT BY MEMBERS PERFORMING.....		PERCENT TIME SPENT BY ALL MEMBERS.....	
DUTY TITLE					
B-TSK					N
U	ARSE MISCELLANEOUS ELECTRICAL SYSTEMS	7.72	17.72		
S	POWER GENERATING SYSTEMS	6.52	34.24		
T	ELECTRICAL/ELECTRONIC TROUBLE SHOOTING	4.07	43.31		
F	AMSE INSPECTIONS AND SAFETY	7.33	55.64		
Z	AMSE SERVICE, BATTERY, ETC.	7.40	63.54		
P	GENERAL AMSE MAINTENANCE	6.32	69.36		5
C	SUPPLY	100.00			
D	AMSE MAINTENANCE ADMINISTRATION/PRODUCTION CONTROL	95.50	5.91		
J	WELDING/CORROSION CONTROL	100.00	5.81		
A	DISSECTING AND IMPLEMENTING	93.26	4.70		
E	AIRCRAFT SERVICING/PLANE CAPTAIN	51.68	3.59		
L	AIR CONDITIONING/REFRIGERATION	13.43	3.52		
X	ENGINE TUNE-UP, IGNITION SYSTEMS, & GOVERNOR CONTROL SYSTEMS	43.82	3.41		10
M	GENERAL MILITARY FUNCTIONS	71.91	2.44		
N	ENGINE COMPONENTS (EXCEPT GASOLINE)	100.00	2.58		
Y	HYDRAULIC SYSTEMS/BRAKE SYSTEMS	32.95	2.54		15
B	TRAINING	32.95	2.41		
R	GENERAL ADMINISTRATION	47.19	2.07		
X	GAS TURBINE ENGINES	46.06	1.64		
V	TRANSMISSION/COOLING SYSTEMS	67.41	1.60		
K	TIRE REPAIR, STEERING, SUSPENSION COMPONENTS	49.44	1.49		20
Q	CRYOGENICS (OXYGEN, NITROGEN, & PNEUMATIC)	23.59	1.31		
		14.80	1.07		

FIGURE A-20, Page 1 JOB DESCRIPTION (OPTION 2)
 A-20

AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION BY OVERLAP STAGE NUMBER

1.3.3 JOB DESCRIPTION-----CASES= 1108-----TASKS= 421-----DUTIES=22-----MEMBERS= 89
 SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 104-----FORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

D-TSK	TASK TITLE	COUNT OF MEMBERS OR TASKS LISTED				CUMULATIVE PERCENT TIME SPENT BY ALL MEMBERS			
		ORDERED BY	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	PERCENT OF MEMBERS PERFORMING	PERCENT OF MEMBERS PERFORMING	ORDERED BY	AVERAGE PERCENT TIME SPENT BY ALL MEMBERS	PERCENT OF MEMBERS PERFORMING	PERCENT OF MEMBERS PERFORMING
M 5	PREPARE WATCH LIST	1.12	1.88	0.04	0.02	1.12	1.88	0.04	0.02
E 19	SERVICE AIRCRAFT HYDRAULIC SYSTEMS	2.24	1.87	0.04	0.04	2.24	1.87	0.04	0.06
T 7	PERFORM CONTINUITY CHECKS	95.50	1.85	1.76	1.83	95.50	1.85	1.76	1.83
T 10	USE SCHEMATIC DIAGRAM	97.75	1.84	1.80	3.63	97.75	1.84	1.80	3.63
T 8	TAKE VOLTAGE READINGS	98.88	1.81	1.79	5.42	98.88	1.81	1.79	5.42
T 9	USE WIRING DIAGRAM	97.75	1.76	1.72	7.14	97.75	1.76	1.72	7.14
D 12	FILL OUT MAINTENANCE ACTION FORMS (MAFIS)	78.65	1.64	1.29	10.12	78.65	1.64	1.29	10.12
F 8	PERFORM OPERATIONAL CHECK ON GSE TO VERIFY DISCREPANCY	69.88	1.64	1.47	11.59	69.88	1.64	1.47	11.59
U 5	REMOVE/REPLACE STARTERS ON GSE	58.88	1.63	1.61	13.20	58.88	1.63	1.61	13.20
U 8	REPLACE GSE ELECTRICAL WIRING	1.12	1.62	0.02	13.22	1.12	1.62	0.02	13.22
U 21	REBUILD FULL PUMPS	100.00	1.61	1.61	14.83	100.00	1.61	1.61	14.83
N 4	HOLD FIELD DAY/SHOP CLEAN UP	1.12	1.61	0.02	16.84	1.12	1.61	0.02	16.84
P 15	REBUILD FMC WATER GUN	95.50	1.60	1.53	16.37	95.50	1.60	1.53	16.37
U 6	MEASURE RESISTANCE	95.50	1.58	1.51	17.38	95.50	1.58	1.51	17.38
U 10	SPLICE ELECTRICAL WIRES	5.62	1.56	0.09	17.98	5.62	1.56	0.09	17.98
N 7	CONDUCT PHYSICAL FITNESS PROGRAM	1.12	1.56	0.02	18.00	1.12	1.56	0.02	18.00
R 15	REMOVE/REPLACE HEAT SHIELD ON GFC	93.26	1.56	1.45	19.45	93.26	1.56	1.45	19.45
R 10	REMOVE/REPLACE CROSS FIRE TUBES ON GFC UNITS	95.50	1.54	1.47	20.92	95.50	1.54	1.47	20.92
U 18	REPLACE GAUGES ON GSE SELECT, HYDRAULIC, PNEUMATIC, ETC.)	79.75	1.54	1.22	22.15	79.75	1.54	1.22	22.15
P 14	INCORPORATE SERVICE CHANGES ON GSE	92.13	1.46	1.35	23.50	92.13	1.46	1.35	23.50
S 13	REPLACE/REPAIR COMPONENTS OF ELECT POWER CABLE HEADS	53.26	1.44	1.34	24.84	53.26	1.44	1.34	24.84
S 17	REPLACE ELECTRICAL POWER CABLE HEADS	91.01	1.44	1.31	26.15	91.01	1.44	1.31	26.15
E 14	PERFORM SOQ-WIRING INSPECTION ON GSE	12.28	1.44	0.26	26.40	12.28	1.44	0.26	26.40
U 6	CHANGE AUTOMOTIVE ALTERNATORS/GENERATORS ON GSE	91.01	1.43	1.30	27.70	91.01	1.43	1.30	27.70
S 2	CHANGE GENERATORS/ALTERNATORS ON POWER GEN SYS	93.26	1.43	1.33	29.04	93.26	1.43	1.33	29.04
U 3	REBUILD ELECTRIC MOTORS (REPLACE ARMATURES, WINDINGS, ETC.)	64.04	1.41	0.90	29.94	64.04	1.41	0.90	29.94
S 3	CHANGE VOLTAGE REGULATORS ON POWER GEN SYS	95.50	1.41	1.35	31.29	95.50	1.41	1.35	31.29
Z 5	TEST/ADJUST SAFETY RELIEF VALVES	2.24	1.40	0.63	31.92	2.24	1.40	0.63	31.92
Z 5	REPLACE BATTERIES IN EQUIPMENT	95.50	1.40	1.34	32.65	95.50	1.40	1.34	32.65
M 10	SCREEN REPORTS FOR ACCURACY/COMPLETENESS	1.12	1.40	0.01	32.66	1.12	1.40	0.01	32.66
F 27	VISUALLY INSPECT GSE FOR APPARENT MALFUNCTIONS	78.65	1.39	1.10	33.76	78.65	1.39	1.10	33.76
F 26	PERFORM QA INSPECTIONS	12.36	1.39	0.17	33.93	12.36	1.39	0.17	33.93
S 12	ADJUST FREQUENCY ON ELECTRICAL POWER UNITS	93.26	1.38	1.29	35.22	93.26	1.38	1.29	35.22
U 4	CHANGE AUTOMOTIVE VOLTAGE REGULATORS ON GSE	89.88	1.38	1.24	36.46	89.88	1.38	1.24	36.46
U 2	REPLACE ELECTRIC MOTORS ON GSE	80.76	1.36	1.21	37.67	80.76	1.36	1.21	37.67
E 18	SERVICE AIRCRAFT PNEUMATIC SYSTEMS	1.12	1.36	0.01	37.68	1.12	1.36	0.01	37.68
Q 2	FILL AIR BOTTLES	1.12	1.36	0.01	37.69	1.12	1.36	0.01	37.69
E 17	SERVICE AIRCRAFT TIRES	1.12	1.36	0.01	37.70	1.12	1.36	0.01	37.70
U 6	FILL NITROGEN CARTS	1.12	1.36	0.01	37.72	1.12	1.36	0.01	37.72

FIGURE A-20, Page 2

AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION BY OVERLAP STAGE NUMBER

DUTY JOB DESCRIPTION CASES= 1108 TASKS= 421 DUTIES=22 MEMBERS= 89
 SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 104 FORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

ORDERED BY.....AVERAGE PERCENT TIME SPENT BY ALL MEMBERS.....						
DUTY TITLE						
U	AMSE MISCELLANEOUS ELECTRICAL SYSTEMS	100.00	17.72	17.72	17.72	17.72	17.72
S	POWER GENERATING SYSTEMS	100.00	16.52	16.52	16.52	16.52	16.52
T	ELECTRICAL/ELECTRONIC TROUBLE SHOOTING	98.88	14.23	14.07	14.07	14.07	14.07
Z	AMSE SERVICE, BATTERY, ETC.	98.88	7.48	7.48	7.48	7.48	7.48
E	AMSE INSPECTIONS AND SAFETY	97.75	7.53	7.53	7.53	7.53	7.53
P	GENERAL AMSE MAINTENANCE	100.00	6.32	6.32	6.32	6.32	6.32
D	AMSE MAINTENANCE ADMINISTRATION/PRODUCTION CONTROL	100.00	5.81	5.81	5.81	5.81	5.81
C	SUPPLY	95.50	5.69	5.69	5.69	5.69	5.69
J	WELDING/CORROSION CONTROL	93.26	4.73	4.73	4.73	4.73	4.73
N	GENERAL MILITARY FUNCTIONS	100.00	2.58	2.58	2.58	2.58	2.58
X	ENGINE TUNE-UP, IGNITION SYSTEMS, & GOVERNOR CONTROL SYSTEMS	71.91	3.40	3.40	3.40	3.40	3.40
A	DIRECTING AND IMPLEMENTING	51.68	3.59	3.59	3.59	3.59	3.59
L	AIR CONDITIONING/REFRIGERATION	43.82	3.41	3.41	3.41	3.41	3.41
R	GAS TURBINE ENGINES	67.41	1.60	1.60	1.60	1.60	1.60
B	TRAINING	47.19	2.07	2.07	2.07	2.07	2.07
M	ENGINE COMPONENTS (DIESEL, GASOLINE)	35.95	2.54	2.54	2.54	2.54	2.54
V	HYDRAULIC SYSTEMS/BRAKE SYSTEMS	32.58	2.41	2.41	2.41	2.41	2.41
M	GENERAL ADMINISTRATION	46.56	1.64	1.64	1.64	1.64	1.64
V	TRANSMISSION/COOLING SYSTEMS	49.44	1.49	1.49	1.49	1.49	1.49
E	AIRCRAFT SPRINGING/PLANE CAPTAIN	13.58	3.52	3.52	3.52	3.52	3.52
K	TIRE REPAIR, STEERING, SUSPENSION COMPONENTS	23.59	1.31	1.31	1.31	1.31	1.31
Q	CRYOGENICS (OXYGEN, NITROGEN, & PNEUMATIC)	14.60	1.07	1.07	1.07	1.07	1.07

A-22

AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION BY OVERLAP STAGE NUMBER

CASES: 1100 TASKS: 421 DUTIES: 22 MEMBERS: 89
SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 104 PERFORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

TASK ID	TASK TITLE	COUNT OF DUTIES OR TASKS LISTED				CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS			
		1	2	3	4	1	2	3	4
1	ASSIGN WORK PRIORITIES	24.72	0.81	0.20	0.20	24.72	0.81	0.20	0.20
2	ASSIGN WORK LOADS	30.34	1.02	0.31	0.51	55.06	1.83	0.51	0.71
3	ENSURE WORK ASSIGNMENTS ARE COMPLETED	53.82	1.36	0.59	1.10	108.88	3.19	1.10	2.20
4	DIRECT (SUPERVISE) WORK IN PROGRESS	32.98	1.35	0.44	1.54	141.86	4.54	1.54	3.08
5	COORDINATE WORKLOAD WITHIN DIVISION	8.39	0.76	0.03	1.62	150.25	5.30	1.62	4.70
6	COUNSEL PERSONNEL CONCERNING MILITARY/PERSONAL MATTERS	15.73	0.67	0.10	1.73	166.00	5.97	1.73	6.40
7	MAKE PERSONNEL ASGMTS (WORK CENTERS, BY SECTIONS, ETC.)	10.11	1.15	0.12	1.84	176.11	7.12	1.84	8.26
8	1 CONDUCT FORMAL CLASSROOM/OPERATIONAL TRAINING FOR LICENSING	14.60	0.86	0.12	1.97	190.71	7.98	1.97	10.23
9	2 SCHEDULE TRAINING	2.24	1.27	0.03	2.00	192.95	9.25	2.00	12.23
10	3 INSTR. PERS. IN SAFETY PRACT. PERT. IN OPER. & MAINT. OF GSE	20.09	1.03	0.29	2.28	213.04	10.28	2.28	14.51
11	4 MAKE/MANUFACTURE TRAINING AIDS	4.99	0.97	0.04	2.32	218.03	11.25	2.32	16.83
12	5 PROOFREAD/SCREEN LESSON GUIDES	1.12	1.16	0.01	2.34	219.15	12.41	2.34	19.17
13	6 ADMINISTER TESTS/EXAMINATIONS	5.62	1.02	0.06	2.39	224.77	13.43	2.39	21.56
14	7 GRADE TESTS/EXAMINATIONS	3.37	1.02	0.03	2.42	228.14	14.45	2.42	23.98
15	8 WRITE LESSON GUIDES	10.11	0.40	0.05	2.47	238.25	14.85	2.47	26.45
16	9 MAINTAIN TRAINING RECORDS	5.62	0.73	0.05	2.52	243.87	15.58	2.52	28.97
17	10 PREPARE TRAINING REPORTS	5.62	0.61	0.03	2.55	249.49	16.19	2.55	31.52
18	11 WRITE TRAINING OUTLINES	8.99	0.55	0.05	2.60	258.48	16.74	2.60	34.12
19	12 PREPARE TESTS/EXAMINATIONS	4.99	0.61	0.02	2.62	263.47	17.35	2.62	36.74
20	13 RELEAS. TRAINING, LECTURES	20.22	0.70	0.14	2.76	283.69	18.05	2.76	39.50
21	14 UPDATE TRAINING MATERIALS	5.62	0.56	0.03	2.79	289.31	18.61	2.79	42.29
22	15 SCREEN SUPPLY REQUESTS FOR CORRECTNESS	6.74	0.86	0.06	2.85	296.05	19.47	2.85	45.14
23	16 SCREEN SUPPLY REQUESTS FOR SUPPLY	11.23	0.94	0.10	2.95	307.28	20.41	2.95	48.09
24	17 DETERMINE PROCUREMENT SOURCE OF PARTS/SUPPLIES (NAVY, OPEN)	24.72	0.99	0.24	3.20	332.00	21.40	3.20	51.29
25	18 FILL OUT SUPPLY REQUISITION FORMS	34.81	0.56	0.34	3.53	366.81	21.96	3.53	54.82
26	19 FOLLOW UP SUPPLY REQUISITIONS	13.48	0.87	0.12	3.65	380.29	22.83	3.65	58.47
27	20 PREPARE INVENTORY REPORTS	7.86	0.73	0.06	3.70	388.15	23.56	3.70	62.17
28	21 UNCRATE EQUIPMENT	43.82	0.73	0.32	4.02	432.00	24.29	4.02	66.19
29	22 CRATE EQUIPMENT FOR SHIPMENT	20.22	0.69	0.14	4.16	452.22	24.98	4.16	70.35
30	23 PACKAGE DELICATE EQUIPMENT FOR SHIPMENT	4.49	0.73	0.03	4.19	456.71	25.71	4.19	74.54
31	24 STOW/BREAK OUT PARTS, SUPPLIES, EQUIPMENT	28.09	1.01	0.23	4.48	484.80	26.72	4.48	79.02
32	25 ORDER PARTS/SUPPLIES	24.04	1.22	0.78	5.26	508.84	28.00	5.26	84.28
33	26 ISSUE TOOLS/EQUIPMENT/SUPPLIES	4.49	1.17	0.05	5.31	513.33	29.17	5.31	89.59
34	27 PICK UP/TURN IN PARTS AND SUPPLIES	37.08	1.15	0.42	5.74	550.41	30.32	5.74	95.33
35	28 INVENTORY TOOLS/EQUIPMENT/SUPPLIES	49.44	0.55	0.47	6.20	600.00	31.87	6.20	101.53
36	29 RESEARCH PUBLICATIONS TO OBTAIN SUPPLY DATA	59.55	1.15	0.68	6.89	659.55	33.02	6.89	108.42
37	30 MAINTAIN PRE-EXPENDED BIN (PER/FREE BIN)	8.99	0.96	0.08	6.97	668.54	34.00	6.97	115.39
38	31 ORDER OPEN PURCHASE ITEMS	14.60	0.89	0.13	7.10	683.14	34.89	7.10	122.49
39	32 SCREEN DEFECTIVE COMPONENTS TO DETERMINE REPAIR CAPABILITY	24.21	1.14	0.33	7.43	707.35	36.03	7.43	129.92
40	33 MAKE SALVAGE RUNS FOR SPARE PARTS	17.98	0.94	0.17	7.60	725.33	36.97	7.60	137.52
41	34 PLACE IDENTIFYING MARKS ON TOOLS/EQUIPMENT	46.06	0.96	0.44	8.04	771.39	37.93	8.04	145.56

FIGURE A-24, Page 2 A-25

1.1.6 GROUP SUMMARY (GRPSUM)

The Group Summary (GRPSUM) Printout displays eight job descriptions per page by duties and tasks listed in sequence. The selected job descriptions are summarized across the page and a value, corresponding to the job description option selected, appears for each task. Usually that value will be from option 3, "average percentage of time performed by all members of the group". The decision to display eight job descriptions per page is made so that the full duty and task titles can be presented rather than their alpha-numeric code numbers. This eliminates the need to refer to the Titles printout to interpret the coded tasks. Figure A-27 is a Group Summary (GRPSUM) ordered from option 1, "percent of members performing", which is representative of a typical GRPSUM.

1.1.6.1 Analysis Use for Training. This printout especially provides aid in the identification of major and sub-major cluster areas on the Diagram, in order to isolate areas for concentrated indepth analysis.

1.1.7 PRIMARY TASK (PRITSK)

The Primary Task Printout (PRITSK), provides a listing of several stages and/or paygrades as in Figure A-29. It shows a specified number of primary tasks. The printout should display 8 selected stages, and a selection of the top "N" tasks based either on percentage up to a prescribed percentage or through a specified number of tasks from each selected group. It is a printout that gives the task and the percentages of each group performing that task. If any member of a selected group performs a primary task in his group, then percentages are printed for that task for all groups, whether the task was primary for every group or not. The percentage values are generally used as generated from job description option 3 - "average percent of time of all members". The printout presents a simplified display of these tasks with their percentage values rounded to the nearest whole percentage.

1.1.7.1 Training Analysis Use. This printout permits comparison of what selected tasks are primary by groups.

1.1.8 ANALYSIS OF SECONDARY FACTORS (ASFACT)

The Analysis of Secondary Factors (ASFACT) Printout displays the degree of involvement to which the job incumbents responded for each task in the Job Task Inventory Questionnaire. There are six values, called secondary factors, to represent different degrees of involvement for a task. The six are:

1. I am in a training status
2. I assist
3. I do (Perform the task)

TASK SURVEY OF PERCENT OF MEMBERS PERFORMING EACH TASK.

COLUMNS 1-10		COLUMNS 11-12		COLUMNS 13-14		COLUMNS 15-16		COLUMNS 17-18		COLUMNS 19-20		COLUMNS 21-22		COLUMNS 23-24		COLUMNS 25-26		COLUMNS 27-28		COLUMNS 29-30		COLUMNS 31-32		COLUMNS 33-34		COLUMNS 35-36		COLUMNS 37-38		COLUMNS 39-40		COLUMNS 41-42		COLUMNS 43-44		COLUMNS 45-46		COLUMNS 47-48		COLUMNS 49-50		COLUMNS 51-52		COLUMNS 53-54		COLUMNS 55-56		COLUMNS 57-58		COLUMNS 59-60		COLUMNS 61-62		COLUMNS 63-64		COLUMNS 65-66		COLUMNS 67-68		COLUMNS 69-70		COLUMNS 71-72		COLUMNS 73-74		COLUMNS 75-76		COLUMNS 77-78		COLUMNS 79-80		COLUMNS 81-82		COLUMNS 83-84		COLUMNS 85-86		COLUMNS 87-88		COLUMNS 89-90		COLUMNS 91-92		COLUMNS 93-94		COLUMNS 95-96		COLUMNS 97-98		COLUMNS 99-100		COLUMNS 101-102		COLUMNS 103-104		COLUMNS 105-106		COLUMNS 107-108		COLUMNS 109-110		COLUMNS 111-112		COLUMNS 113-114		COLUMNS 115-116		COLUMNS 117-118		COLUMNS 119-120		COLUMNS 121-122		COLUMNS 123-124		COLUMNS 125-126		COLUMNS 127-128		COLUMNS 129-130		COLUMNS 131-132		COLUMNS 133-134		COLUMNS 135-136		COLUMNS 137-138		COLUMNS 139-140		COLUMNS 141-142		COLUMNS 143-144		COLUMNS 145-146		COLUMNS 147-148		COLUMNS 149-150		COLUMNS 151-152		COLUMNS 153-154		COLUMNS 155-156		COLUMNS 157-158		COLUMNS 159-160		COLUMNS 161-162		COLUMNS 163-164		COLUMNS 165-166		COLUMNS 167-168		COLUMNS 169-170		COLUMNS 171-172		COLUMNS 173-174		COLUMNS 175-176		COLUMNS 177-178		COLUMNS 179-180		COLUMNS 181-182		COLUMNS 183-184		COLUMNS 185-186		COLUMNS 187-188		COLUMNS 189-190		COLUMNS 191-192		COLUMNS 193-194		COLUMNS 195-196		COLUMNS 197-198		COLUMNS 199-200		COLUMNS 201-202		COLUMNS 203-204		COLUMNS 205-206		COLUMNS 207-208		COLUMNS 209-210		COLUMNS 211-212		COLUMNS 213-214		COLUMNS 215-216		COLUMNS 217-218		COLUMNS 219-220		COLUMNS 221-222		COLUMNS 223-224		COLUMNS 225-226		COLUMNS 227-228		COLUMNS 229-230		COLUMNS 231-232		COLUMNS 233-234		COLUMNS 235-236		COLUMNS 237-238		COLUMNS 239-240		COLUMNS 241-242		COLUMNS 243-244		COLUMNS 245-246		COLUMNS 247-248		COLUMNS 249-250		COLUMNS 251-252		COLUMNS 253-254		COLUMNS 255-256		COLUMNS 257-258		COLUMNS 259-260		COLUMNS 261-262		COLUMNS 263-264		COLUMNS 265-266		COLUMNS 267-268		COLUMNS 269-270		COLUMNS 271-272		COLUMNS 273-274		COLUMNS 275-276		COLUMNS 277-278		COLUMNS 279-280		COLUMNS 281-282		COLUMNS 283-284		COLUMNS 285-286		COLUMNS 287-288		COLUMNS 289-290		COLUMNS 291-292		COLUMNS 293-294		COLUMNS 295-296		COLUMNS 297-298		COLUMNS 299-300		COLUMNS 301-302		COLUMNS 303-304		COLUMNS 305-306		COLUMNS 307-308		COLUMNS 309-310		COLUMNS 311-312		COLUMNS 313-314		COLUMNS 315-316		COLUMNS 317-318		COLUMNS 319-320		COLUMNS 321-322		COLUMNS 323-324		COLUMNS 325-326		COLUMNS 327-328		COLUMNS 329-330		COLUMNS 331-332		COLUMNS 333-334		COLUMNS 335-336		COLUMNS 337-338		COLUMNS 339-340		COLUMNS 341-342		COLUMNS 343-344		COLUMNS 345-346		COLUMNS 347-348		COLUMNS 349-350		COLUMNS 351-352		COLUMNS 353-354		COLUMNS 355-356		COLUMNS 357-358		COLUMNS 359-360		COLUMNS 361-362		COLUMNS 363-364		COLUMNS 365-366		COLUMNS 367-368		COLUMNS 369-370		COLUMNS 371-372		COLUMNS 373-374		COLUMNS 375-376		COLUMNS 377-378		COLUMNS 379-380		COLUMNS 381-382		COLUMNS 383-384		COLUMNS 385-386		COLUMNS 387-388		COLUMNS 389-390		COLUMNS 391-392		COLUMNS 393-394		COLUMNS 395-396		COLUMNS 397-398		COLUMNS 399-400		COLUMNS 401-402		COLUMNS 403-404		COLUMNS 405-406		COLUMNS 407-408		COLUMNS 409-410		COLUMNS 411-412		COLUMNS 413-414		COLUMNS 415-416		COLUMNS 417-418		COLUMNS 419-420		COLUMNS 421-422		COLUMNS 423-424		COLUMNS 425-426		COLUMNS 427-428		COLUMNS 429-430		COLUMNS 431-432		COLUMNS 433-434		COLUMNS 435-436		COLUMNS 437-438		COLUMNS 439-440		COLUMNS 441-442		COLUMNS 443-444		COLUMNS 445-446		COLUMNS 447-448		COLUMNS 449-450		COLUMNS 451-452		COLUMNS 453-454		COLUMNS 455-456		COLUMNS 457-458		COLUMNS 459-460		COLUMNS 461-462		COLUMNS 463-464		COLUMNS 465-466		COLUMNS 467-468		COLUMNS 469-470		COLUMNS 471-472		COLUMNS 473-474		COLUMNS 475-476		COLUMNS 477-478		COLUMNS 479-480		COLUMNS 481-482		COLUMNS 483-484		COLUMNS 485-486		COLUMNS 487-488		COLUMNS 489-490		COLUMNS 491-492		COLUMNS 493-494		COLUMNS 495-496		COLUMNS 497-498		COLUMNS 499-500		COLUMNS 501-502		COLUMNS 503-504		COLUMNS 505-506		COLUMNS 507-508		COLUMNS 509-510		COLUMNS 511-512		COLUMNS 513-514		COLUMNS 515-516		COLUMNS 517-518		COLUMNS 519-520		COLUMNS 521-522		COLUMNS 523-524		COLUMNS 525-526		COLUMNS 527-528		COLUMNS 529-530		COLUMNS 531-532		COLUMNS 533-534		COLUMNS 535-536		COLUMNS 537-538		COLUMNS 539-540		COLUMNS 541-542		COLUMNS 543-544		COLUMNS 545-546		COLUMNS 547-548		COLUMNS 549-550		COLUMNS 551-552		COLUMNS 553-554		COLUMNS 555-556		COLUMNS 557-558		COLUMNS 559-560		COLUMNS 561-562		COLUMNS 563-564		COLUMNS 565-566		COLUMNS 567-568		COLUMNS 569-570		COLUMNS 571-572		COLUMNS 573-574		COLUMNS 575-576		COLUMNS 577-578		COLUMNS 579-580		COLUMNS 581-582		COLUMNS 583-584		COLUMNS 585-586		COLUMNS 587-588		COLUMNS 589-590		COLUMNS 591-592		COLUMNS 593-594		COLUMNS 595-596		COLUMNS 597-598		COLUMNS 599-600		COLUMNS 601-602		COLUMNS 603-604		COLUMNS 605-606		COLUMNS 607-608		COLUMNS 609-610		COLUMNS 611-612		COLUMNS 613-614		COLUMNS 615-616		COLUMNS 617-618		COLUMNS 619-620		COLUMNS 621-622		COLUMNS 623-624		COLUMNS 625-626		COLUMNS 627-628		COLUMNS 629-630		COLUMNS 631-632		COLUMNS 633-634		COLUMNS 635-636		COLUMNS 637-638		COLUMNS 639-640		COLUMNS 641-642		COLUMNS 643-644		COLUMNS 645-646		COLUMNS 647-648		COLUMNS 649-650		COLUMNS 651-652		COLUMNS 653-654		COLUMNS 655-656		COLUMNS 657-658		COLUMNS 659-660		COLUMNS 661-662		COLUMNS 663-664		COLUMNS 665-666		COLUMNS 667-668		COLUMNS 669-670		COLUMNS 671-672		COLUMNS 673-674		COLUMNS 675-676		COLUMNS 677-678		COLUMNS 679-680		COLUMNS 681-682		COLUMNS 683-684		COLUMNS 685-686		COLUMNS 687-688		COLUMNS 689-690		COLUMNS 691-692		COLUMNS 693-694		COLUMNS 695-696		COLUMNS 697-698		COLUMNS 699-700		COLUMNS 701-702		COLUMNS 703-704		COLUMNS 705-706		COLUMNS 707-708		COLUMNS 709-710		COLUMNS 711-712		COLUMNS 713-714		COLUMNS 715-716		COLUMNS 717-718		COLUMNS 719-720		COLUMNS 721-722		COLUMNS 723-724		COLUMNS 725-726		COLUMNS 727-728		COLUMNS 729-730		COLUMNS 731-732		COLUMNS 733-734		COLUMNS 735-736		COLUMNS 737-738		COLUMNS 739-740		COLUMNS 741-742		COLUMNS 743-744		COLUMNS 745-746		COLUMNS 747-748		COLUMNS 749-750		COLUMNS 751-752		COLUMNS 753-754		COLUMNS 755-756		COLUMNS 757-758		COLUMNS 759-760		COLUMNS 761-762		COLUMNS 763-764		COLUMNS 765-766		COLUMNS 767-768		COLUMNS 769-770		COLUMNS 771-772		COLUMNS 773-774		COLUMNS 775-776		COLUMNS 777-778		COLUMNS 779-780		COLUMNS 781-782		COLUMNS 783-784		COLUMNS 785-786		COLUMNS 787-788		COLUMNS 789-790		COLUMNS 791-792		COLUMNS 793-794		COLUMNS 795-796		COLUMNS 797-798		COLUMNS 799-800		COLUMNS 801-802		COLUMNS 803-804		COLUMNS 805-806		COLUMNS 807-808		COLUMNS 809-810		COLUMNS 811-812		COLUMNS 813-814		COLUMNS 815-816		COLUMNS 817-818		COLUMNS 819-820		COLUMNS 821-822		COLUMNS 823-824		COLUMNS 825-826		COLUMNS 827-828		COLUMNS 829-830		COLUMNS 831-832		COLUMNS 833-834		COLUMNS 835-836		COLUMNS 837-838		COLUMNS 839-840		COLUMNS 841-842		COLUMNS 843-844		COLUMNS 845-846		COLUMNS 847-848		COLUMNS 849-850		COLUMNS 851-852		COLUMNS 853-854		COLUMNS 855-856		COLUMNS 857-858		COLUMNS 859-860		COLUMNS 861-862		COLUMNS 863-864		COLUMNS 865-866		COLUMNS 867-868		COLUMNS 869-870		COLUMNS 871-872		COLUMNS 873-874		COLUMNS 875-876		COLUMNS 877-878		COLUMNS 879-880		COLUMNS 881-882		COLUMNS 883-884		COLUMNS 885-886		COLUMNS 887-888		COLUMNS 889-890		COLUMNS 891-892		COLUMNS 893-894		COLUMNS 895-896		COLUMNS 897-898		COLUMNS 899-900		COLUMNS 901-902		COLUMNS 903-904		COLUMNS 905-906		COLUMNS 907-908		COLUMNS 909-910		COLUMNS 911-912		COLUMNS 913-914		COLUMNS 915-916		COLUMNS 917-918		COLUMNS 919-920		COLUMNS 921-922		COLUMNS 923-924		COLUMNS 925-926		COLUMNS 927-928		COLUMNS 929-930		COLUMNS 931-932		COLUMNS 933-934		COLUMNS 935-936		COLUMNS 937-938		COLUMNS 939-940		COLUMNS 941-942		COLUMNS 943-944		COLUMNS 945-946		COLUMNS 947-948		COLUMNS 949-950		COLUMNS 951-952		COLUMNS 953-954		COLUMNS 955-956		COLUMNS 957-958		COLUMNS 959-960		COLUMNS 961-962		COLUMNS 963-964		COLUMNS 965-966		COLUMNS 967-968		COLUMNS 969-970		COLUMNS 971-972		COLUMNS 973-974		COLUMNS 975-976		COLUMNS 977-978		COLUMNS 979-980		COLUMNS 981-982		COLUMNS 983-984		COLUMNS 985-986		COLUMNS 987-988		COLUMNS 989-990		COLUMNS 991-992		COLUMNS 993-994		COLUMNS 995-996		COLUMNS 997-998		COLUMNS 999-1000	
AS RATING	GROUP	SUM	DUTIES	AND	TASKS	COLUMN	HEADINGS	ARE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

THE FOLLOWING GROUPS ARE INCLUDED IN THIS REPORT:

MEMBERS IN THIS CATEGORY		
ASSP001	PAYGRADE E1	MEMBERS= 2.
ASSP002	PAYGRADE E2	MEMBERS= 20.
ASSP003	PAYGRADE E3	MEMBERS= 175.
ASSP004	PAYGRADE E4	MEMBERS= 340.
ASSP005	PAYGRADE E5	MEMBERS= 343.
ASSP006	PAYGRADE E6	MEMBERS= 172.
ASSP007	PAYGRADE E7	MEMBERS= 64.
ASSP008	PAYGRADE E8	MEMBERS= 13.
ASSP009	PAYGRADE E9	MEMBERS= 3.
ASSP010	JOB DESCRIPTION (TOTAL)	MEMBERS= 1108.

[illegible]

THE SECOND TO LAST DIGIT IN THE COLUMN HEADING IDENTIFIES THE PAYGRADE

PRIMARY TASKS ARE REPORTED IN WHOLE PERCENTS FOR THE FOLLOWING GROUPS

GROUP DESCRIPTION

1	ASSP002 PAYGRADE E2	CONTAINING 20 MEMBERS.
2	ASSP003 PAYGRADE E3	CONTAINING 145 MEMBERS.
3	ASSP004 PAYGRADE E4	CONTAINING 340 MEMBERS.
4	ASSP005 PAYGRADE E5	CONTAINING 343 MEMBERS.
5	ASSP006 PAYGRADE E6	CONTAINING 172 MEMBERS.
6	ASSP007 PAYGRADE E7	CONTAINING 64 MEMBERS.
7	ASSP008 PAYGRADE E8	CONTAINING 11 MEMBERS.
8	ASSP009 PAYGRADE E9	CONTAINING 3 MEMBERS.

PRIMARY TASKS WERE SELECTED ON X OF MEMBERS PERFORMING.

IN EACH GROUP. TASKS ARE LISTED UNTIL A CUMULATIVE OF 35 % IS REACHED.

IF ANY MEMBER IN ANY GROUP PERFORMED A PRIMARY TASK IN HIS GROUP, THEN THAT TASK IS PRINTED FOR ALL GROUPS.

TASK DESCRIPTION	1*	2*	3*	4*	5*	6*	7*	8*
A 2 ASSIGN WORK LOADS	5	14	22	49	60	78	62	67
B 5 PROCEED/SCREEN LESSON GUIDES	0	3	4	10	26	45	38	67
C 1 MAINTAIN STATUS RECORDS	5	17	19	37	54	59	38	67
D 11 TIME ALTER READINGS ON GSE	30	63	61	58	40	38	15	0
E 12 TROUBLESHOOT EQUIP BY SUBSTITUTION OF KNOWN GOOD PARTS	30	50	48	43	24	20	23	0
F 12 PERFORM 200 HOUR INSPECTION ON GSE	25	45	41	34	30	20	23	0
G 16 PERFORM ACCEPTANCE CHECKS ON GSE	30	42	41	49	44	36	23	0
H 21 REVIEW 3-H SOURCE DOCUMENTS (MAP'S, SAF'S, LOGS)	0	15	10	34	60	69	46	0
I 5 REPLACE FATER MOTORS ON GSE (RADIATOR, DEATER, ETC.)	20	32	48	45	41	25	24	0

PRIMARY TASK REPORTS BASED ON STAGES- TIME

PRIMARY TASKS ARE REPORTED IN WHOLE PERCENTS FOR THE FOLLOWING GROUPS

SOLAR NUMBER GROUP DESCRIPTION

17	A305373	STAGE 667- PAYGRADE E-3	CONTAINING 2 MEMBERS.
21	A305373	STAGE 667- PAYGRADE E-4	CONTAINING 11 MEMBERS.
23	A305373	STAGE 667- PAYGRADE E-5	CONTAINING 17 MEMBERS.

PRIMARY TASKS WERE REPORTED ON 2 OF 3 STAGES DESCRIBED.
IN EACH GROUP, TASKS ARE LISTED UNDER A CATEGORY OF 100 PERCENTS.
IF ANY GROUP TASKS WERE REPORTED IN A CATEGORY, TASKS IN OTHER CATEGORIES WERE NOT REPORTED.

TASK DESCRIPTION	1*	2*	3*
S 9 REPAIR TRANSFORMER RECTIFIER UNITS.	50	91	53
S 14 CHANGE ELECTRICAL POTER CABLE HEADS	100	91	100
S 17 REPLACE INDIVIDUAL ELECTRONIC/ELECTRICAL COMPONENTS	100	100	94
S 18 FABRICATE/REPAIR INTERCONNECTING ELECTRICAL CABLES	100	100	88
P 9 REPLACE COMMON HARDWARE (SCREWS, FASTENERS, BOLTS, ETC.)	100	100	84
P 10 TIGHTEN LOOSE SCREWS, DZUS FASTENERS, ETC.	100	100	88

4. I do and supervise
5. I only supervise
6. I instruct only

The term "secondary factor" is to distinguish the data from "primary data". (See Glossary).

Comparison of task involvement responses (by paygrade within a group) with consideration of the percent of members performing (by paygrade) aids in narrowing the number of tasks in determining valid training environment. For example, the predominant paygrade(s) of members indicating they are "in training" or "they assist in a given task", along with data on the "percent of members performing", and "average percent of members performing" aids in determining if and where in the training pipeline the training required for task performance should be provided. Similarly, predominantly senior paygrade members state that they only supervise or instruct the performance of a task, additional training in the supervision or instruction may be required and be considered for advanced training.

The team member can compare the levels of involvement in task performance for eight job descriptions or stages and still include the full duty/task titles per page. In Figure A-32, this printout displays a comparison of the degrees of involvement in individual tasks by members of selected stages or job descriptions.

1.1.8.1 Analysis Uses for Training.

1. As an analytical tool, the ASFACT has particular value. It will identify those areas where formal training may be required.
2. It assists in determining the validity of selected tasks for training consideration.

1.1.9 VARIABLE SUMMARY (VARSUM)

The Variable Summary (VARSUM) Printout displays the distribution of background data for all cases in a survey, or for all members which belong to selected job description groups (stages), or by paygrades.

Responses to questions related to service schools attended, tools and equipment utilized, manuals and references used, or years and/or months served out of the occupational area can be of great assistance to the team member by providing supportive data for the stages under analysis. Equipment or tools that are obsolete and are no longer utilized can be identified. Special requirements for needed safety equipment can also be indicated. The team member has a great variety of options when using this printout. Special items of background data required for detailed investigation can be procured on request.

1.1.9.1 Equipment Variable Summary (Equipment VARSUM). A frequently utilized option is the Variable Summary of Equipment Printout (Equipment VARSUM). This printout contains a summation by paygrades or stages on the Diagram of three

discrete intervals (variables) indicating how many members use/operate, repair, or both use/operate and repair each piece of equipment. The intervals are:

1. Use/operate
2. Repair
3. Both (use/operate and repair)

Figure A-34 , is a page extracted from an Equipment VARSUM. Of stage 667, on the third variable, V151, Water Alcohol trailer/truck, within the third group, (paygrade E-5), which contains 17 members; no members use/operate the equipment, 1 member repairs the equipment, and 1 member does both. Therefore, 15 members have no contact with this piece of equipment.

1.1.9.2 Analysis Uses for Training.

1. The Equipment VARSUM can provide data which indicates the equipment being operated or maintained by initial-entry personnel, and should therefore be included in the basic-level training. Additionally, equipment operated or maintained by those at higher paygrades should be included in Advanced Technical Training or Specialized Courses. After review and analysis of the Equipment VARSUM data, the team members and the subject-matter specialist can decide what equipment or tools must be included in training to enable the graduates to perform the jobs of the rating.

1.1.10 WORKER CHARACTERISTICS OF THE JOB (VARSUM)

The performance of certain jobs requires the possession of certain basic qualities, known as worker characteristics of the job.

The Worker Characteristics of the Job (VARSUM) Printout indicates the degree of physical, mental, supervisory and managerial characteristics that are required in the performance of the job within the rating. Each variable in this printout is rated on the basis of three intervals: below average, average, and above average.

Figure A-35, is a page extracted from a VARSUM of Worker Characteristics. The variable data on V058, the computer code number assigned to worker characteristic of "heavy work for extended periods", is the listing, by columns of paygrades, of the responses of individuals, who completed Part C "Worker Characteristics of the Job" of the Questionnaire.

The numbers under column one and column three are the numbers of members in paygrade E-3 and paygrade E-5 of stage 667 who responded that there is below average, average or above average heavy work for extended periods required for the accomplishment of their jobs; of the 17 members in paygrade E-5, 9 members or approximately 53%, indicated that "heavy work for extended periods" was required in their jobs.

1.1.10.1 Analysis Use for Training. Detailed analysis of data in the Worker Characteristics of the Job (VARSUM) provides further assistance in the completion of the Job Task Analysis and can be utilized in the Training Task Analysis process.

RESPONSES ON A SCALE FROM 1 TO 33 FOR THE AS RATING BY SELECTED STAGES
FROM THE TIME SIMILARITY DIAGRAM

THE FOLLOWING GROUPS ARE INCLUDED IN THIS REPORT

GROUP IDENTITY = AS06673 STAGE 567- PAYGRADE E-3 CONTAINING 2 MEMBERS.
GROUP IDENTITY = AS06674 STAGE 567- PAYGRADE E-4 CONTAINING 11 MEMBERS.
GROUP IDENTITY = AS06675 STAGE 567- PAYGRADE E-5 CONTAINING 17 MEMBERS.

VARIABLE DATA ONE: V100 = MNU-82 MUNITIONS TRAILER

	AS06673	AS06674	AS06675
1	0	0	0
2	0	0	0
3	0	0	0
TOTAL COUNTED ABOVE	0*	0*	0*
OTHER	2	11	17
MEAN	0.0	0.0	0.0
STD DEVIATION	0.0	0.0	0.0

VARIABLE DATA ONE: V150 = PROPELLER TRAILER/DOLLIE

	AS06673	AS06674	AS06675
1	0	0	0
2	0	0	0
3	0	0	0
TOTAL COUNTED ABOVE	0*	0*	0*
OTHER	2	11	17
MEAN	0.0	0.0	0.0
STD DEVIATION	0.0	0.0	0.0

VARIABLE DATA ONE: V151 = WATER ALCOHOL TRAILER/TRUCK

	AS06673	AS06674	AS06675
1	0	0	0
2	0	0	0
3	0	0	0
TOTAL COUNTED ABOVE	0	0	0
OTHER	1	1	15
MEAN	0.0	0.0	0.0
STD DEVIATION	0.0	0.0	0.0

A-34

FIGURE A-34 EQUIPMENT VARIABLE SUMMARY PRINTOUT

AS RATING EQUIPMENT AND WORKER CHARACTERISTICS

VARIABLE DATA ONE VOICE - HEAVY WORK FOR EXTENDED PERIODS									
INTERVAL: 1.0000									
1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
TOTAL COUNTED / POINT									
OTHER									
MEAN									
STD DEVIATION									

VARIABLE DATA ONE VOICE - HEAVY WORK FOR INDEFINITE PERIODS									
INTERVAL: 1.0000									
1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
TOTAL COUNTED / POINT									
OTHER									
MEAN									
STD DEVIATION									

VARIABLE DATA ONE VOICE - FINGER DEXTERITY									
INTERVAL: 1.0000									
1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0
TOTAL COUNTED / POINT									
OTHER									
MEAN									
STD DEVIATION									

FIGURE A-35 WORKER CHARACTERISTICS VARIABLE SUMMARY PRINTOUT

1.2 PROCEDURAL GUIDANCE IN THE USE OF NOTAP COMPUTER PRINTOUT DATA

The Systems Approach in the design and development of instructional programs requires the identification of jobs within an occupational rating, duties within the job and the tasks related to each duty. This is a part of Job Task Analysis that is being accomplished by NOTAP. NOTAP not only provides the types of data listed above, but analysis of this data provides related data. The related data can be utilized as a basis for determining which duties and tasks should be made part of the formal training courses, and which tasks should be taught in on-board-training environments, etc. Analysis of the related data also can determine the level for formal training (preparatory, basic, advanced, supervisory, or specialized) of each job task placed in the formal training environment.

Procedural guidance is required to select and utilize computer printouts that will provide the desired related data in a format that will aid the Job and Training Task Analysis process.

Naval Training Activities will normally receive the following NOTAP Computer printouts in the initial package.

1. Hierarchical Time Similarity Printout
2. Print Variable (PRTVAR)
3. Variable Summary of Equipment by Paygrades (Equipment VARSUM)
4. Job Descriptions by Paygrades (JOBDEC)
5. Job Descriptions of Selected Representative Stages (JOBDEC)
6. ASFACT by Paygrade
7. Titles

The first three printouts listed above are used to identify job areas within a rating; the remaining four printouts are the basis for Job and Training Task Analysis.

1.2.1 OVERVIEW OF THE HIERARCHICAL TIME SIMILARITY MATRIX DIAGRAM

Initially it is necessary to assemble the Hierarchical Time Similarity Matrix Diagram in viewable form. The Diagram portrays job relationships in a "tree-like" structure of the merging "clusters" or groups. The assembled Diagram enables the Task Analysis Team member to examine a "cluster" or group, identify case composition of the group and measure the group's similarity. He can visualize and obtain a generalized assessment of the degree of similarity among jobs and groups of jobs. In the "tree" portrayed, the "upper" portions represent discrete job groups. The size of the group membership is small but the similarity of the work being performed is high. The "lower" portions of the tree depict larger and more inclusive job groups. Moving down the "tree", the size of the membership of the groups increases but the similarity of the jobs being performed decreases as members performing different jobs are added to increase the size of the group. At the "base" of the "tree" the membership size is maximum. It includes the entire rating population surveyed, and the similarity is minimum since all of the varied jobs are included.

One requirement, placed by a NOTAP team member on the computer clustering process, is that the minimum number of personnel (cases) that should be in each starter group (the uppermost groups on the Diagram) be less than 10 in order to give a better portrayal of the development of each job. The degree of similarity is measured by two averages printed on the Diagram for each stage. These are "average-within" and "average-between". These measures assist the team members in extracting the most complete description of a job.

The team members locate and label the stages on the Diagram, for which job descriptions were provided in the initial package. In the analysis of the Diagram it is necessary for the team members to scan the entire assembled Diagram to select additional stages that will enable him to identify major job groupings.

The stages selected should be at any point where (a) stages merge, (b) where separate areas are portrayed, and (c) where many branches are apparent prior to a merger at a stage. Therefore, the team member's first task will be to identify the merge points, complex merge points and separate areas as a means of determining the significance of data portrayed in each group or cluster. The Diagram will also show obvious "breaks" or divisions in the rating under analysis. The fact that two or more separate areas occur should make the team members aware that the rating being analyzed has several differing job areas.

1.2.2 RECOMMENDED SCANNING PROCEDURES

The process of selecting stages for analysis requires scanning the Diagram for major and then, sub-major stages within each. For the purpose of describing this scanning process the NOTAP survey of the Aviation Support Equipment Technician (AS) Rating will be utilized as an example.

The recommended scanning procedure is illustrated in Figure A-60. As shown, the Initial Scan is used to select stages which will aid in identifying major cluster groups which tie into the main trunk of the "tree". These major cluster groups are the major job areas of the rating. The Second Scan is the selection of stages, within each major stage (if they exist), and other branches, which will further aid in determining the jobs of the rating.

Additional scans, moving up the "tree" when necessary, will further aid in the identification of the "rating structure" being analyzed. The further the analysis progresses "up the tree", the more definitive is the job. Once the team member selects the stages to be analyzed, he will have identified the major job areas of the rating and can request from NOTAP, special computer printouts for analysis of these job areas as required.

1.2.3 SELECTION OF MAJOR AND SUB-MAJOR CLUSTER GROUPINGS FOR IDENTIFICATION OF SPECIFIC JOB AREAS OF THE AS RATING

The NOTAP survey data from the Aviation Support Equipment Technician (AS) Rating was compiled from responses of approximately 2,000 men in the rating. The

NOTAP Job Task Inventory Questionnaire was administered to 1108 members of the AS rating. In this rating, as shown in Figure A-39, members in paygrades E-1 through E-5 are divided into three service ratings ASE (Electrical), ASH (Hydraulic), and ASM (Mechanical). At paygrade E-6 the service ratings combine to form the general rating AS. The data was gathered and processed as described previously to obtain the NOTAP printouts that were provided in the initial package.

During the initial scan of the Time Similarity Matrix Diagram for the AS Rating, Figure 4-118, the following stages were selected.

- 95 (137 cases)
- 71 (561 cases)
- 67 (11 cases)
- 56 (07 cases)
- 30 (15 cases)
- 18 (22 cases)
- 12 (16 cases)
- 10 (299 cases)

All of the above stages are tied to the main "trunk of the tree-like" structure. A total of 1068 cases were considered during this Initial Scan, or 96.3% of the 1108 cases in the AS survey.

In order to perform a Second Scan, the team member must select sub-major stages within the major groups selected in the Initial Scan. The following was accomplished with the AS rating survey during the Second Scan:

1. The following sub-major stages identified for stage 95.

- 267 (15 cases)
- 667 (30 cases)
- 211 (93 cases)
- 445 (12 cases)
- 310 (29 cases)
- 180 (16 cases)
- 114 (09 cases)

2. The following sub-major stages were identified for stage 71:

- 745 (30 cases)
- 720 (52 cases)
- 399 (76 cases)
- 334 (42 cases)
- 249 (28 cases)
- 183 (90 cases)
- 128 (150 cases)
- 88 (39 cases)

AS RATING AT THE TIME OF THE NOTAP SURVEY

	<u>AS</u>	<u>ASE</u>	<u>ASH</u>	<u>ASM</u>	<u>TOTAL</u>
E-1		0	0	2	2
E-2		6	10	4	20
E-3		48	28	72	148
E-4		97	94	150	341
E-5		83	96	165	344
E-6	172				172
E-7	65				65
E-8	13				13
E-9	3				3
TOTAL SURVEYED	<u>253</u>	<u>234</u>	<u>228</u>	<u>393</u>	<u>1108</u>
AVERAGE ON BOARD STRENGTH AT TIME OF SURVEY	529	398	364	650	1941
% SURVEYED	47.8	58.8	62.6	60.5	57.1

FIGURE 4-97 BREAKDOWN OF AS RATING SURVEYED BY PAYGRADE AND SERVICE RATING

3. The following sub-major stages were identified for stage 10:

69 (37 cases)
73 (70 cases)
209 (45 cases)
21 (47 cases)
35 (96 cases)
75 (48 cases)
77 (26 cases)
38 (25 cases)

Normally, two scans are sufficient to determine the jobs being accomplished by the job incumbents in the rating. Second Scans were not required for Initial Scan stages 67, 56, 30, 18 and 12 because of their low case membership. The scanning procedures identify the stages for further analysis and for which additional printouts may be required.

1.2.4 SELECTION OF COMPUTER PRINTOUTS BASED ON DIAGRAM SCANS

The following computer printouts, with the exception of the Job Description (JOBDECS) and Duty Variable (DUVAR), will have multi-stage listings which permit the team member to review and evaluate a number of selected stages on one printout. During the previously mentioned scanning procedures, groups of stages were limited to eight in number. This was done to allow the printout of the duty/task titles on the multi-column reports. If the selection of stages, during a scan, exceeds eight, the team member should request two or more reports with the stages grouped and divided.

The following special computer printouts were requested for further Job Task Analysis of the AS rating.

1. For stages selected in the Initial Scan:
 - a. Job description (JOBDEC), by paygrade, ordered by average percent time spent by all members (option 3) for each stage.
 - b. Stage job description (JOBDEC), ordered by average percent time spent by all members (option 3).
 - c. Group Summary (GRPSUM) of selected stages ordered by percent of members performing in alpha-numerical sequence with task titles.
 - d. Analysis of Secondary Factors (ASFACT) of identified stages.
 - e. Equipment VARSUM of identified stages.
 - f. Primary Task (PRITSK), by stages, selected on percent of members performed until a cumulative of 35-40 percent is reached in each stage.
2. For stages selected in the Second and Additional Scans.
 - a. Stage JOBDECS ordered by average percent time spent by all members (option 3).
 - b. GRPSUM of selected stages ordered by percent of members performing with alpha-numerical sequence with task titles.
 - c. Equip VARSUM of selected stages (recommended only for Initial and Second Scans).
 - d. ASFACT of identified stages (only for Initial and Second Scans).
3. Duty Variable (DUVAR) for the rating, computed on percent of time spent in each duty area.

The special printouts requested for the AS rating are representative of what should be requested after the scanning procedures are completed. They provide the data which are the most useful in the Job Task Analysis of a rating. Consideration of the particular rating undergoing analysis, different requirements for data usage, or imposition of other special conditions may necessitate the requesting of data in different printout formats than those requested for the AS Rating Job Task Analysis.

1.2.5 ANALYSIS OF SPECIAL REQUESTED NOTAP COMPUTER PRINTOUTS

Upon receipt of the requested additional printouts the Task Analysis Team must verify that the printouts received are actually the printouts requested.

1.2.5.1 Analysis of the Group Summary (GRPSUM). This computer printout serves as one of the major analytical tools for the Task Analysis Team. Figure A-42, is selected portions of the GRPSUM of the stages selected in the Initial Scan of the AS Diagram. The job descriptions for the identified stages are summarized across the page and a value, corresponding to the job description option selected, appears for each duty and task. Usually, that value will be from option 1, "Percent of members performing" or option 3, "average percentage of time spent by all group members". Experience has recommended that selected stages be limited to eight, so that the duty and task titles can be printed on the printout pages.

The GRPSUM printout allows the team member to compare the relative difference in task performance among the different job descriptions. This, in turn, will aid in the identification of the selected cluster groups (stages) to isolate areas for concentrated indepth analysis. On the Figure A-42, the "circles" are placed around the stage number for which the corresponding data values apply. On the first sheet, "Duty Summary", 47% of the members in Stage 95 perform tasks in Duty M, "General Administration" and 55% of the members in Stage 71, and 82% of the members in stage 10 perform tasks in Duty M. For Duty S, "Power Generating System", 99% of the members in stage 95 performed tasks, and 68% of the members in stage 71, and 9% of the members in stage 10 performed tasks.

On the following sheet, of Figure A-43 Task Summary, are the task listings for these selected duties. On task S-1, "Replace Component Parts on Voltage Regulators of Power Generating Systems", 61% of the members in stage 95 indicated that they performed this task, whereas 31% of the members in stage 71, and 0% of the members in stage 10 responded that they perform this task.

These percentages indicate that this task is primarily performed by members of the rating grouped into stage 95. Analysis of all the tasks will provide further indications of the jobs accomplished by the members of each stage.

GROUPS OF STAGES 95 THRU 10

DUTY SUMMARY OF PERCENT OF MEMBERS PERFORMING EACH TASK.
SUMMARY OF STAGES FROM AS THE DIAGRAM

THE FOLLOWING GROUPS ARE INCLUDED IN THIS SUMMARY:

GROUP NUMBER	MEMBERS
001350	127
001350	561
001350	11
001350	7
001350	15
001350	22
001350	16
001350	299

THE FOLLOWING GROUPS ARE INCLUDED IN THIS SUMMARY:

GROUP NUMBER	MEMBERS
001350	127
001350	561
001350	11
001350	7
001350	15
001350	22
001350	16
001350	299

DUTY/TASK	TITLE	PERCENT
1	DIRECTING AND SUPERVISING	93
2	TRAINING	53
3	REPAIR	53
4	MAINTENANCE ADMINISTRATION/ACCIDENT CONTROL	53
5	REPAIR	53
6	REPAIR	53
7	REPAIR	53
8	REPAIR	53
9	REPAIR	53
10	REPAIR	53
11	REPAIR	53
12	REPAIR	53
13	REPAIR	53
14	REPAIR	53
15	REPAIR	53
16	REPAIR	53
17	REPAIR	53
18	REPAIR	53
19	REPAIR	53
20	REPAIR	53
21	REPAIR	53
22	REPAIR	53
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24	REPAIR	53
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26	REPAIR	53
27	REPAIR	53
28	REPAIR	53
29	REPAIR	53
30	REPAIR	53
31	REPAIR	53
32	REPAIR	53
33	REPAIR	53
34	REPAIR	53
35	REPAIR	53
36	REPAIR	53
37	REPAIR	53
38	REPAIR	53
39	REPAIR	53
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41	REPAIR	53
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85	REPAIR	53
86	REPAIR	53
87	REPAIR	53
88	REPAIR	53
89	REPAIR	53
90	REPAIR	53
91	REPAIR	53
92	REPAIR	53
93	REPAIR	53
94	REPAIR	53
95	REPAIR	53
96	REPAIR	53
97	REPAIR	53
98	REPAIR	53
99	REPAIR	53
100	REPAIR	53

FIGURE A-42 GROUP SUMMARY PRINTOUT

1.2.5.2 Utilization of the Job Description. During the analysis of the GRPSUM difficulties may arise in differentiating task involvement between stages. In this situation, the team member would refer to stage(s) job description (JOBDEC) and/or the job description by paygrades, within the stage(s) in question, for a clearer insight of the duties and tasks performed by the population grouped at that particular stage.

To clarify the above statement attention is directed to Figures A-45 , Pages 1-2 and A-47, Pages 1-2, which are pages from the job description printouts of stages 95 and 71 respectively. Consider task S-1 "replace component parts on voltage regulator of power generating system".

Within stage 95 (Figure A-45), 61.31% of the members, in that stage grouping, spent an average percent time of 1.3% in the performance of the task S-1. For comparative purposes, this would be 31 minutes of a 40-hour work week. The average percent time spent by all members of the stage is 0.80% which would be 19.2 minutes of a 40-hour work week.

In contrast, within stage 71 (Figure A-47), 31.37% of the members in the stage spend an average percent time of 0.55% in the performance of the task S-1 which would be 13.2 minutes. The average percent time spent by all members of the stage is 0.17% which is 4.08 minutes. This would indicate to the analyst that stage 95 is much more electrically orientated in work performance than stage 71.

A thorough analysis of task performance and average percent time spent by all members of the group will assist the team member to determine the type of work performed by the job incumbents of the group---experience with NOTAP data indicates that the above-mentioned percentages aid in identifying "job areas" and "jobs" within a rating. All tasks must and should be considered. It must be emphasized that not only task performance, but the amount of time personnel spend on a task should be a factor in determining its importance as a task. Therefore, the JOBDECS, which emphasize the average percent of time spent by all group members should be examined to identify job areas and jobs and/or to decide which tasks should be selected for various training purposes.

An indepth examination of task performance among the various stages within a particular scan with first the GRPSUM and then the JOBDEC of the stages will allow team members to see the type of work activity being accomplished by the members of the stage. It will become apparent that many of the tasks within the inventory are of such nature that training for them does not belong in formal training courses. The challenge, therefore, is to determine the training environment, if any, and the degree/extent of training that should be provided for a job-incumbent to perform these tasks. The percentage tables within a JOBDEC assist in this decision. Experience with task analysis computer data indicates that training for tasks performed by at least 20 percent of the members of a job group should be considered for formal training courses. Another major factor in determining task importance for training is the amount of time personnel spend performing that task. Therefore, after considering percent of involvement, the average percent time spent by all members of the group should be examined.

JOB DESCRIPTIONS FROM THE TIME OF FORMATION									
DUTY FOR DESCRIPTION: CASES 1108-1110, TASKS 421-423, MEMBERS 137									
SELECTED FROM THE HIERARCHY POSITIONS 1 THROUGH 137, FORMED AT STAGE 95, OF ACCORDING TO THE SIMILARITY.									
CUMULATIVE PERCENTAGE OF AVERAGE PERCENTAGE TIME SPENT BY ALL MEMBERS									
AVERAGE PERCENTAGE TIME SPENT BY ALL MEMBERS									
AVERAGE PERCENTAGE TIME SPENT BY MEMBERS PERFORMING									
ORDERED BY DUTY IDENTIFIERS									
DUTY IDENTIFIER	DUTY TITLE	1	2	3	4	5	6	7	8
A	DIRECTING AND IMPLEMENTATION	53.55	3.74	1.96					
B	TRAINING	47.44	2.00	0.94					
C	SUPPLY	95.62	6.14	5.87					
D	AMSE MAINTENANCE ADMINISTRATION/PRODUCTION CONTROL	99.27	6.00	5.96					
E	LABORER SERVICES/PLANE CARRIER	100.00	2.53	5.53					
F	AMSE INSPECTIONS AND SAFETY	97.81	9.03	8.88					
G	WELDING/CORROSION CONTROL	93.62	5.55	5.31					
H	TIRE REPAIR, STEERING, SUSPENSION COMPONENTS	37.96	2.12	0.80					
I	AIR CONDITIONING/REFRIGERATION	37.96	3.97	1.51					
J	GENERAL ADMINISTRATION	97.00	1.88	0.88					
K	GENERAL MILITARY FUNCTIONS	100.00	6.57	6.57					
L	GENERAL AMSE MAINTENANCE	13.25	1.09	0.25					
M	CRYOGENICS (OXYGEN, NITROGEN, & PHOSPHORIC)	68.61	3.85	2.64					
N	GAS TURBINE ENGINES	92.52	13.46	11.68					
O	POWER GENERATING SYSTEMS	100.00	15.01	15.01					
P	ELECTRICAL/ELECTRONIC TROUBLE SHOOTING	52.55	2.04	1.37					
Q	AMSE MISCELLANEOUS ELECTRICAL SYSTEMS	48.90	2.76	1.35					
R	TRANSMISSION/COOLING SYSTEMS	70.32	3.37	2.48					
S	ENGINE COMPONENTS (DIESEL, GASOLINE)	46.71	3.37	1.58					
T	ENGINE TIME-UP, INJECTION SYSTEMS, & GOVERNOR, & OTHER SYSTEMS	99.27	8.90	8.84					
U	HYDRAULIC SYSTEMS/BRAKE SYSTEMS								
V	AMSE SERVICE, BATTERY, ETC.								

FIGURE A-45, Page 1 JOB DESCRIPTION PRINTOUT (GROUP 95)

D-TASK	TASK TITLE	Z	Y	N
Q 4	ADJUST PNEUMATIC PRESSURE REGULATORS	5.94	0.96	41.42
Q 5	PRESSURE CHECK PNEUMATIC SYSTEMS	1.46	0.97	41.44
Q 6	FILL NITROGEN CARTRIDGES	3.73	1.36	41.44
Q 7	REBUILD COMPRESSOR REGULATORS	0.73	0.97	41.44
Q 8	CHANGE COMPRESSOR PISTON OILS TO ETCAL	0.73	0.97	41.44
R 1	ADJUST ENGINE OVER-SPEED SWITCHES	54.74	1.12	42.07
R 2	ADJUST TEMPERATURE CONTROL UNIT ON GTC	19.25	1.06	42.26
R 3	REMOVE/REPLACE COMBUSTION CANS ON GTC	13.87	1.23	42.42
R 4	REMOVE/REPLACE TAIL CONES TO GTC	10.22	1.24	42.55
R 5	REPLACE DIAPHRAGMS ON FUEL CONTROL UNIT	13.15	1.24	42.72
R 6	CLEAN FITTINGS INSIDE FUEL CONTROL UNIT (AIR, FUEL)	10.95	1.11	42.84
R 7	REMOVE/REPLACE MODULATING, SHUT-OFF VALVE ON GTC	15.33	1.26	43.03
R 8	REPLACE DIAPHRAGMS IN SHUT-OFF VALVE	8.03	1.23	43.12
R 9	CLEAN PASSAGES IN AIR SHUT-OFF VALVES	5.11	1.20	43.19
R 10	REMOVE/REPLACE CROSS FIRE TUBES ON GTC UNITS	8.76	1.22	43.29
R 11	REPLACE BALL BEARING IN FUEL SHUT-OFF VALVE	9.49	1.10	43.39
R 12	REMOVE/REPLACE AIR SCOPED VALVE (PNEUMATIC SHUT-OFF VALVE)	15.76	1.13	43.57
R 13	REMOVE/REPLACE FUEL ASSEMBLY ON GTC UNIT	13.15	1.15	43.91
R 14	BUILD UP GTC UNIT HOSES (BURNER HOSES)	10.22	1.10	43.97
R 15	REMOVE/REPLACE FUEL SOLDERING GTC	10.22	1.10	43.97
S 1	REPLACE COMPONENT PARTS ON VOLTAGE REG OF POWER GEN SYS	61.31	1.30	44.87
S 2	CHANGE GENERATOR/ALTERNATORS ON POWER GEN SYS	33.59	1.30	44.87
S 3	CHANGE VOLTAGE REGULATORS ON POWER GEN SYS	8.03	1.30	44.87
S 4	REBUILD RELAYS	43.07	1.04	45.21
S 5	REBUILD SLID RINGS	58.32	1.06	45.21
S 6	REBUILD COMBINATORS	54.74	1.02	45.80
S 7	REBUILD GENERATOR/ALTERNATORS ON POWER GEN SYS	48.17	1.01	45.80
S 8	REPAIR ROTARY/RECTIFIERS ON PRINTED CIRCUIT BOARDS	27.74	0.91	45.80
S 9	REPAIR TRANSFORMER RECTIFIER UNITS	24.82	0.81	45.80
S 10	ADJUST TRANSFORMER RECTIFIER UNITS	24.82	0.81	45.80
S 11	ADJUST UPPER AND LOWER VOLTAGE LIMITS ON POWER UNITS	62.77	1.24	45.80
S 12	ADJUST FREQUENCY ON ELECTRICAL POWER UNITS	74.45	1.34	45.80
S 13	REPLACE/REPAIR COMPONENTS OF ELECT POWER CABLE HEADS	74.45	1.40	45.80
S 14	CHANGE ELECTRICAL POWER CABLE HEADS	74.45	1.40	45.80
S 15	CHANGE ELECTRICAL POWER CABLE HEADS	74.45	1.40	45.80
S 16	BUILD-UP ELECTRICAL POWER CABLES	74.45	1.40	45.80
S 17	REPLACE INDIVIDUAL ELECTRONIC/ELECTRICAL COMPONENTS	74.45	1.40	45.80
S 18	FABRICATE/REPAIR INTERCONNECTING ELECTRICAL CABLES	74.45	1.40	45.80
S 19	REPLACE CANNON PLUGS	74.45	1.40	45.80
T 1	LOCALize CABLES/CIRCUITS OF ELECTRICAL EQUIPMENT SCHEM.	87.59	1.50	45.80
T 2	DRAW SCHEMATIC DIAGRAMS	87.59	1.50	45.80
T 3	TAKE CURRENT READINGS	87.59	1.50	45.80
T 4	MEASURE FREQUENCY	87.59	1.50	45.80
T 5	MEASURE CAPACITANCE	87.59	1.50	45.80
T 6	MEASURE RESISTANCE	87.59	1.50	45.80
T 7	PERFORM CONTINUITY CHECKS	87.59	1.50	45.80

FIGURE A-45, Page 2

JOB DESCRIPTIONS FROM THE TIAL DIAGRAM

QUANTITY FOR REQUESTING ROUTINE--CASES= 1108--TASKS= 421--UNTIL 5022--REFERENCES= 361
 SELECTED FROM THE HIERARCHY POSITIONS 138 THROUGH 635--FORMED AT STAGE 71 OF GROUPING ON THE SIMILARITY.

ORDERED BY DUTY IDENTIFIERS.		DUTY TITLE		CUMULATIVE \$000 OF TASKS COSTING \$1000 OR MORE		CUMULATIVE \$000 OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS		AVERAGE PERCENT TIME SPENT BY ALL MEMBERS		PERCENT OF MEMBERS PERFORMING		PERCENT OF MEMBERS PERFORMING	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	DIRECTING AND IMPLEMENTING			64.70	2.74	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77
B	TRAINING			56.54	1.90	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
C	SUPPLY			56.79	5.22	5.05	5.05	5.05	5.05	5.05	5.05	5.05	5.05
D	AMSE MAINTENANCE ADMINISTRATION/PRODUCTION CONTROL			56.79	5.00	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84
E	ALBERT SERVICES/PLANE CAPTAIN			56.79	1.13	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
F	AMSE INSPECTIONS AND SAFETY			59.82	12.30	25.93	25.93	25.93	25.93	25.93	25.93	25.93	25.93
G	WELDING/CRACKS CONTROL			56.39	9.85	5.70	5.70	5.70	5.70	5.70	5.70	5.70	5.70
H	FIRE REPAIR, SLEETING, SUSPENSION COMPONENTS			51.62	2.70	3.07	3.07	3.07	3.07	3.07	3.07	3.07	3.07
I	AIR CONDITIONING/REFRIGERATION			50.32	2.10	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
J	GENERAL ADMINISTRATION			55.26	2.10	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
K	GENERAL MILITARY FUNCTIONS			50.26	2.06	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
L	GENERAL AMSE MAINTENANCE			100.00	7.63	7.03	7.03	7.03	7.03	7.03	7.03	7.03	7.03
M	CRYOGENICS (OXYGEN, NITROGEN, E. PNEUMATIC)			64.83	2.87	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
N	GAS TURBINE ENGINES			57.00	2.98	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
O	POWER GENERATING SYSTEMS			67.74	2.87	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76
P	ELECTRICAL/ELECTRONIC TROUBLE SHOOTING			62.71	3.44	2.05	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Q	AMSE MISCELLANEOUS ELECTRICAL SYSTEMS			91.60	5.38	4.94	4.94	4.94	4.94	4.94	4.94	4.94	4.94
R	TRANSMISSION/COOLING SYSTEMS			93.05	4.65	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34
S	ENGINE COMPONENTS (DIESEL, GASOLINE)			88.23	6.75	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
T	ENGINE TURBINE/IGNITION SYSTEMS			82.78	7.23	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36
U	HYDRAULIC SYSTEMS/BRAKE SYSTEMS			97.14	9.62	9.08	9.08	9.08	9.08	9.08	9.08	9.08	9.08
V	AMSE SERVICE, BATTERY, ETC.			99.64	9.61	9.58	9.58	9.58	9.58	9.58	9.58	9.58	9.58

D-TSK	TASK TITLE	Σ	Σ	Σ	Σ	Σ	N
P 17	REMOVE/REPLACE COMPONENTS ON BELLS AND START SYSTEM	11.94	0.48	0.06			48.24
P 18	REMOVE/REPLACE COMPONENTS ON BELLS AND START SYSTEM	58.46	0.04	0.38			48.62
P 19	ADJUST PRESSURE REGULATORS ON BELLS AND START SYSTEM	7.04	0.58	0.04			48.66
P 20	REED FUEL SYSTEM	55.97	0.66	0.37			49.03
P 21	CHANGE DRIVE CHAINS ON FORKLIFT	17.29	0.52	0.23			49.06
P 22	ADJUST DEADMAN SEAT (SAFETY SEAT) ON FORKLIFT	11.94	0.54	0.09			49.15
Q 1	QUALIFY/CALIBRATE GAUGES	11.94	0.63	0.07			49.22
Q 2	FILL AIR BOTTLES	21.57	0.55	0.12			49.34
Q 3	TEST/ADJUST SAFETY RELIEF VALVES	37.61	0.70	0.26			49.60
Q 4	ADJUST PNEUMATIC PRESSURE REGULATORS	28.16	0.53	0.16			49.76
Q 5	PRESSURE CHECK PNEUMATIC SYSTEMS	28.34	0.58	0.16			49.93
Q 6	FILL NITROGEN CARTS	11.74	0.49	0.06			49.98
Q 7	REBUILD NITROGEN REGULATORS	13.52	0.50	0.05			50.04
Q 8	REBUILD OXYGEN REGULATORS	8.73	0.51	0.04			50.08
Q 9	CHANGE NITROGEN BOTTLES ON TRAILERS	29.14	0.55	0.11			50.19
Q 10	REPAIR HIGH PRESSURE BOOSTER PUMPS (NITROGEN)	9.27	0.59	0.04			50.22
Q 11	CHANGE COMPONENT PARTS ON NITROGEN CARTS (LINES, ETC.)	26.02	0.68	0.19			50.40
Q 12	CHANGE FILTERS ON NITROGEN CARTS	22.99	0.60	0.14			50.53
Q 13	PERFORM LEAK TEST ON PNEUMATIC COMPONENTS (BOTTLES, ETC.)	28.16	0.61	0.17			50.70
Q 14	REBUILD AIR COMPRESSOR PILOT VALVE	14.28	0.52	0.07			50.77
Q 15	REBUILD AIR COMPRESSOR BLOW DOWN VALVES	14.79	0.52	0.08			50.85
K 1	ADJUST ENGINE OVER-SPEED SWITCHES	34.58	0.60	0.20			51.05
R 2	ADJUST TEMPERATURE CONTROL UNIT ON GTC	26.02	0.57	0.14			51.20
R 3	REMOVE/REPLACE COMBUSTION CANS ON GTC	46.92	0.49	0.13			51.33
R 4	REMOVE/REPLACE TAIL CONES, ETC.	22.12	0.52	0.11			51.45
R 5	REPLACE DIAPHRAGMS IN FUEL CONTROL UNIT	22.64	0.51	0.12			51.56
R 6	CLEAN FITTINGS INSIDE FUEL CONTROL UNIT (AIR, FUEL)	21.21	0.57	0.12			51.68
R 7	REMOVE/REPLACE MODULATING, SHUT-OFF VALVE ON GTC	23.17	0.56	0.13			51.81
R 8	REPLACE DIAPHRAGMS IN SHUT-OFF VALVE	13.19	0.42	0.05			51.86
S 1	REPLACE COMPONENT PARTS ON VOLTAGE REG OF POWER GEN SYS	13.72	0.42	0.05			51.92
S 2	REPAIR TRANSFORMER RECTIFIER UNITS	31.37	0.59	0.17			52.75
S 3	REPAIR TRANSFORMER RECTIFIER UNITS	23.53	0.45	0.10			53.61
S 4	REPAIR TRANSFORMER RECTIFIER UNITS	26.56	0.46	0.12			53.73
S 5	REPAIR TRANSFORMER RECTIFIER UNITS	11.94	0.40	0.04			53.78
S 6	REPAIR TRANSFORMER RECTIFIER UNITS	10.16	0.36	0.04			53.81
S 7	ADJUST TRANSFORMER RECTIFIER UNITS	12.30	0.41	0.05			53.86

The team members, who are cognizant of the technical and military requirements of the rating under consideration must also consider each and every task eliminated from formal training requirements. For example: the requirement to be able to apply mouth-to-mouth resuscitation or ability to disarm an explosive device for a particular rating, though seldom performed, must be trained for in some environments for a particular target population.

1.2.5.3 Utilization of the Analysis of Secondary Factors (ASFACT) Printout. An additional tool for indepth examination of task performance is the ASFACT. This printout reflects the response to the secondary factor of each task statement in the Job Task Inventory Questionnaire. Each task statement in the Questionnaire offers two responses:

1. Relative amount of time spent performing each task statement in which the incumbent is involved; and
2. Degree/extent of involvement in the task performance.

A response by the incumbent to his involvement in a task reflects the secondary factor of that task statement, i.e., does he:

1. Perform the task in a training status,
2. Assist in the performance of the task,
3. Perform the task,
4. Perform and supervise the performance of the task,
5. Supervise the performance of the task or,
6. Instruct in the performance of the task.

The ASFACT will reflect the number of personnel either by stage or paygrade that responded to any of the six variables. The ASFACT by paygrade will enable the team member to determine at what paygrade level personnel should be trained and to what level of involvement the training should be directed. For example; Figure A-50 is pages from the ASFACT requested for the Initial Scan. For Task S-1 the following information is indicated:

For Stage 95

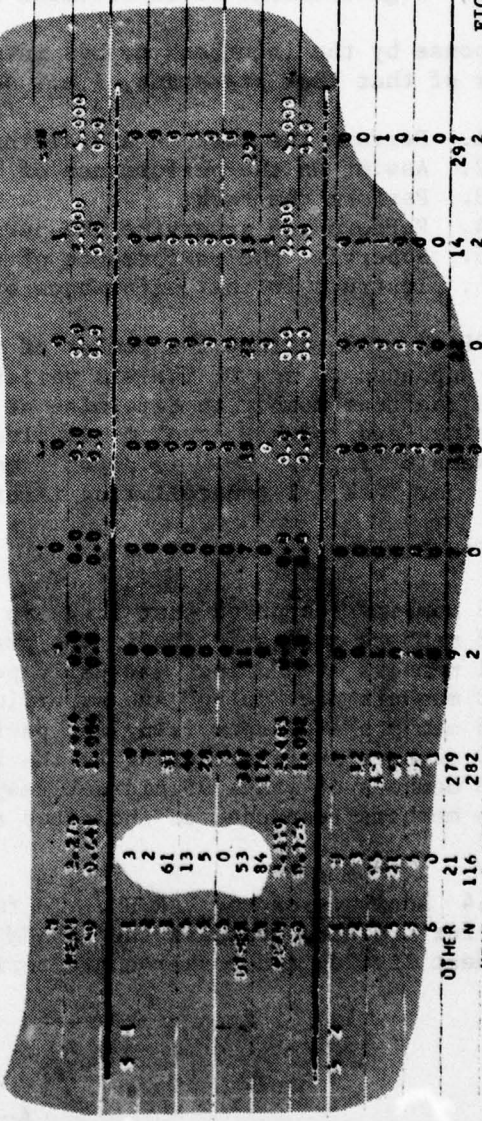
3 members responded that they are in training for this task
2 members are assisting in the performance of this task
61 members are "doing" (actually performing) the task
13 members are "doing" and supervising the performance of this task
5 members are supervising the performance of this task
0 members are instructing in the task
53 members of stage 95 did not respond to task S-1 in the survey
84 members responded as indicated above.

1.2.5.4 Analysis of the VARSUM. To further refine job description identifications for training purposes the VARSUM will provide information in two areas: Equipment listing and worker characteristics.

ASPECT FOR STAGES FROM AS TIME DIAGRAM

GROUP NUMBER = 95, ORDERED FROM 1 TO 137
 0071340 GROUP NUMBER = 71, ORDERED FROM 138 TO 299
 0067130 GROUP NUMBER = 67, ORDERED FROM 300 TO 710
 0056130 GROUP NUMBER = 56, ORDERED FROM 711 TO 121
 0030130 GROUP NUMBER = 30, ORDERED FROM 122 TO 170
 0018330 GROUP NUMBER = 18, ORDERED FROM 171 TO 270
 0012330 GROUP NUMBER = 12, ORDERED FROM 271 TO 370
 001340 GROUP NUMBER = 10, ORDERED FROM 371 TO 1091

GROUP IDENT.	0095740	0071340	0067340	0056340	0030340	0018340	0012340	0010340
GROUP MEMBERS	237	561	11	7	15	22	16	299
FACTOR SURGROUP	137	561	11	7	15	22	16	299
OT-TK VALUE								
A 1	1	17	0	0	0	0	0	4
	2	49	3	0	3	0	0	24
	3	13	50	1	0	3	0	32
	4	8	65	4	1	2	2	52
	5	0	12	0	0	0	0	21
	6	0	0	0	0	0	0	1
OTHER	102	368	3	7	11	14	13	161
	35	193	8	0	4	8	3	138
MEAN	2.800	3.031	3.125	0.0	2.500	2.875	4.667	3.486
SD	0.821	1.091	0.927	0.0	0.866	0.781	0.943	1.137
A 2	1	0	10	0	0	0	0	3
	2	18	60	1	0	0	0	
	3	16	61	1				
			88					



GROUP IDENT.	0095740	0071340	0067340	0056340	0030340	0018340	0012340	0010340
GROUP MEMBERS	237	561	11	7	15	22	16	299
FACTOR SURGROUP	137	561	11	7	15	22	16	299
OT-TK VALUE								
A 1	1	17	0	0	0	0	0	4
	2	49	3	0	3	0	0	24
	3	13	50	1	0	3	0	32
	4	8	65	4	1	2	2	52
	5	0	12	0	0	0	0	21
	6	0	0	0	0	0	0	1
OTHER	102	368	3	7	11	14	13	161
	35	193	8	0	4	8	3	138
MEAN	2.800	3.031	3.125	0.0	2.500	2.875	4.667	3.486
SD	0.821	1.091	0.927	0.0	0.866	0.781	0.943	1.137
A 2	1	0	10	0	0	0	0	3
	2	18	60	1	0	0	0	
	3	16	61	1				
			88					

FIGURE A-50 ANALYSIS OF SECONDARY FACTORS PRINTOUT

A-50

1.2.5.4.1 Equipment VARSUM. During development of the Job Task Inventory Questionnaire a list of equipment, tools, and test equipment was compiled. Each billet incumbent was requested to refer to the list and indicate his association as to operation and/or repair of each item. The VARSUM of equipment will indicate the Vxxx number and the equipment title listed, and three intervals of response for each type of equipment listed in the Questionnaire. Figure A-52 is pages, in part, of the Equipment VARSUM of initial scan stages. Refer to the data on V229 MMG-2 Power Unit, note that within stage 95 the following intervals of response data is available:

1. three members responded to using/operating this equipment,
2. forty members responded to only repairing it, and,
3. thirty-eight members indicated both using and repairing.

The other stage members who did not indicate involvement with this equipment was fifty-six.

This summary of equipment for a rating is very useful in the Training Task Analysis process when designing the training pipeline and determining of eliminating or adding equipment in the training process.

1.2.5.4.1.1 Determination of Eliminating Antiquated Equipment or Add New Equipment. After completion of the review of data in the equipment VARSUM, the team member and subject-matter specialist must decide what course(s) should be designed/developed in order to include equipment that is necessary to properly train students in the performance of tasks within jobs of the rating.

The equipment VARSUM is invaluable for data which provides information as to which various types of equipment, tools, and test equipments are utilized or maintained in the fleet; thus, indicating to the team member what equipment should be included in or deleted from the training process.

1.2.5.4.2 Worker Characteristics of the Job VARSUM. This printout is normally printed along with the Equipment VARSUM. It portrays the degree of physical, mental, and leadership characteristics that the job incumbent has found to be required in the performance of the jobs in the rating. For each worker characteristic there are three intervals of response: 1 - "below average", 2 - "average", 3 - "above average". The printout also indicates the number of members within the group who responded to one of the three intervals.

Analysis of this printout provides data on the characteristics of various jobs. For example, in Figure A-53 the data indicates that stage 71 jobs are characterized by certain physical demands, such as; "foot and leg dexterity". Of stage 71 members:

- 185 members responded to "below average"
- 34 members responded to "average"
- 161 members responded to "above average"
- and 181 members did not respond to this worker characteristic.

THE FOLLOWING GROUPS ARE:

1 = USE/OPERATE
2 = REPAIR
3 = BOTH

GROUP IDENTITY = 0003340 GROUP NUMBER = 95 ORDERED FROM 1 TO 137 CONTAINING 137 MEMBERS.
 GROUP IDENTITY = 0071340 GROUP NUMBER = 71 ORDERED FROM 138 TO 275 CONTAINING 138 MEMBERS.
 GROUP IDENTITY = 0067340 GROUP NUMBER = 67 ORDERED FROM 276 TO 313 CONTAINING 38 MEMBERS.
 GROUP IDENTITY = 0056340 GROUP NUMBER = 56 ORDERED FROM 314 TO 371 CONTAINING 57 MEMBERS.
 GROUP IDENTITY = 0030340 GROUP NUMBER = 30 ORDERED FROM 372 TO 402 CONTAINING 30 MEMBERS.
 GROUP IDENTITY = 0018340 GROUP NUMBER = 18 ORDERED FROM 403 TO 476 CONTAINING 74 MEMBERS.
 GROUP IDENTITY = 0012340 GROUP NUMBER = 12 ORDERED FROM 477 TO 591 CONTAINING 114 MEMBERS.
 GROUP IDENTITY = 0010340 GROUP NUMBER = 10 ORDERED FROM 592 TO 729 CONTAINING 138 MEMBERS.

VARIABLE DATA ON: V149 = MHU-82 MUNITIONS TRAILER

INTERVAL.....

1	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340
2	1	8	0	0	1	0	0	1
3	1	20	1	0	0	1	0	0
OTHER	0	3	0	0	1	0	0	0
MEAN	0	3	1*	0*	2*	1*	1*	1*
STD DEVIATION	111	2.500	2.500	2.500	2.500	2.500	2.500	2.500

111
2.500
2.500
2.500

VARIABLE DATA ON: V229 = MHG-2 POWER UNIT

INTERVAL.....

1	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340
2	3	35	0	1	0	1	0	45
3	40	59	0	0	1	1	2	0
OTHER	38	40	0	0	1	1	0	4
MEAN	81*	150*	0*	1*	2*	3*	2*	49*
STD DEVIATION	56	111	0.0	6	13	19	14	250

111
2.500
2.500
2.500

VARIABLE DATA ON: V231 = MA-5 POWER UNIT

INTERVAL.....

1	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340
2	4	26	1	1	0	2	0	49
3	28	78	1	1	0	1	1	0
OTHER	29	128	0	2	3	1	2	3
MEAN	61*	232*	2*	4*	3*	4*	3*	52*
STD DEVIATION	76	329	9	3	12	18	13	247

111
2.500
2.500
2.500

FIGURE A-52. EQUIPMENT VARIABLE SUMMARY PRINTOUT

VARIABLE DATA ON: V231 = MA-5 POWER UNIT

INTERVAL.....

1	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340
2	5	0	0	0	0	0	0	0

VARSUM OF STAGES OF AS DIAGRAM

VARIABLE DATA ON: V062 = HAND AND ARM DEXTERITY									
...INTERVAL...									
	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340	
1	1	7	0	0	0	1	0	12	
2	2	49	1	0	0	3	0	1	
3	3	21	0	0	3	0	0	2	
TOTAL COUNTED ABOVE	6*	77*	1*	0*	3*	4*	0*	15*	
OTHER	131	484	10	7	12	18	16	284	
MEAN	2.3333	2.1313	2.0000	0.0	3.0000	1.7500	0.0	1.3333	
STD DEVIATION	0.7454	0.5750	0.0	0.0	0.0	0.4330	0.0	0.6992	

VARIABLE DATA ON: V063 = FOOT AND LEG DEXTERITY									
...INTERVAL...									
	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340	
1	40	185	0	4	3	8	3	67	
2	2	34	0	0	0	1	1	1	
3	23	161	1	0	3	0	0	6	
TOTAL COUNTED ABOVE	66*	380*	7*	4*	6*	9*	3*	74*	
OTHER	71	181	9	3	9	13	13	225	
MEAN	1.7424	1.9368	1.2857	1.0000	2.0500	1.1111	1.0000	1.1757	
STD DEVIATION	0.9424	0.9521	0.6944	0.0	1.0000	0.3143	0.0	0.5541	

VARIABLE DATA ON: V064 = EYE-HAND COORDINATION									
...INTERVAL...									
	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340	
1	5	15	1	0	1	0	1	21	
2	12	43	2	0	1	4	0	0	
3	6	44	0	0	4	0	0	4	
TOTAL COUNTED ABOVE	23*	122*	3*	0*	6*	4*	1*	25*	
OTHER	613	433	8	7	9	18	15	274	
MEAN	2.0415	2.3197	1.6667	0.0	2.5000	2.0000	1.0000	1.3200	
STD DEVIATION	0.5501	0.6807	0.4714	0.0	0.7638	0.0	0.0	0.7332	

VARIABLE DATA ON: V065 = FOOT-EYE-HAND COORDINATION									
...INTERVAL...									
	0095340	0071340	0067340	0056340	0030340	0018340	0012340	0010340	
1	0	4	0	0	0	1	0	4	
2	2	24	1	0	0	1	0	0	
3	1	14	0	0	2	0	0	0	
TOTAL COUNTED ABOVE	3*	42*	1*	0*	2*	2*	0*	4*	
OTHER	134	519	10	7	13	20	16	295	
MEAN	2.3333	2.2381	2.0000	0.0	3.0000	1.5000	0.0	1.0000	
STD DEVIATION	0.4714	0.6098	0.0	0.0	0.0	0.5000	0.0	0.0	

FIGURE A-53 WORKER CHARACTERISTICS VARIABLE SUMMARY PRINTOUT

Approximately 68% of stage 71 members responded to an interval; this indicated that possession of this characteristic is essential for the performance of stage 71 jobs. Comparison can be made between stages to determine the composite worker characteristics of the jobs in each stage.

1.2.6 DESCRIPTION OF THE JOB AREAS AND JOBS OF THE AS RATING

Throughout the analysis process, the Diagram was analyzed, major divisions within the AS rating were identified in terms of jobs performed, selected job groups (stages) were further analyzed and descriptive titles were determined for the jobs of the AS rating. As depicted in Figure A-56, the AS rating, three job areas were identified; Aviation Support Equipment Electrical, Aviation Support Equipment Mechanical, and Administration/Support.

The second job area contained three sub-divisions: Mechanical, Hydraulic, and Mechanical/Hydraulic.

The third job area contained two sub-divisions: Supervision and Instruction.

In addition to the AS job areas identified it was found that a substantial number of AS rating personnel were working primarily in job areas of ratings other than AS (i.e., AK, AZ, AM, and AD billets).

The Job Titles for the Aviation Support Equipment Electrical job area are:

1. Power Generation and Aviation Support Equipment Electrical/Electronic Systems Maintenance
2. Electrical Maintenance Working Supervisors

The Job Titles for the Aviation Support Equipment Mechanical job area are:

1. Mechanical Division:
 - a. Mechanical Engine Repair, service, and tune-up
 - b. Air conditioning/refrigeration equipment mechanical maintenance
 - c. Gas Turbine check crew, maintenance and AMSE service
2. Hydraulic Division:
 - a. Hydraulic System Inspection and check crews
3. Mechanical/Hydraulic Division:
 - a. Primary Mechanical/Hydraulic Maintenance
 - b. General Mechanical/Hydraulic Maintenance
 - c. Mechanical/Hydraulic Welding and Corrosion Control
 - d. Mechanical/Hydraulic check crews
 - e. Mechanical/Hydraulic work supervisors

The job titles for the Administration/Support job area:

1. Supervision:
 - a. Aviation Support Equipment Technician Staff Billets and AMSE Division Leading Chief Petty Officer
 - b. AMSE Supervisor
 - c. Quality Assurance and Safety Supervisor

2. Instruction:
 - a. Instructors
 - b. Training Petty Officers

Those AS rating personnel working in job areas of other ratings (AK, AZ, AM, AD) included:

1. Aircraft Maintenance Administration and Production Control
2. Plane Captain and Aircraft Maintenance Line Supervisors
3. Supply (Full Time)

Figures A-57, A-58, and A-59, are listings of the computer stage numbers and number of AS personnel within each stage that comprise the initial scan job clusters 95, 71, and 10.

The two major work areas, stage 95 with 137 members and stage 71 with 561 members, represent the major AS working environment which is Intermediate Maintenance Activity oriented.

The principal mechanical work area with 574 personnel represents the major mechanical/hydraulic similarity. This consolidation resulted in a definition of work accomplished by incumbents presently identified as mechanical and hydraulic specialists. Of the total ASH personnel included in the survey 64% were included in the mechanical/hydraulic overlap whereas 17% indicated a generally exclusive hydraulic involvement. This indicated to the team member the necessity of merging the ASH and the ASM Service Ratings for training purposes.

Further analysis presented a contrasting condition with respect to the ASE (Electrical) Service Rating. Sixty-seven percent of the ASE's included in the survey performed predominately ASE-related duties. The balance of ASE personnel were found to be involved in duties not related to the AS rate, i.e., plane captains, aircraft line supervisors, or work in Aviation Supply and Aircraft Production Control activities.

1.3 ANALYSIS OF A SPECIFIC JOB AREA IN COURSE JOB TASK INVENTORY DEVELOPMENT

As previously stated, the AS rating was selected as an example to illustrate the use of NOTAP materials for this Manual. The data-gathering instrument was designed to cover all aspects of the rating. Duty titles were selected and tasks were grouped to assist the incumbent to identify the tasks which applied to his job. Each job description, developed from billet incumbent responses, provides a listing of the percentage of time spent performing each duty.

NOTAP data bank can provide an almost endless variety of data from which to develop training requirement information. The most important of this data is a listing of tasks indicating the percentage of personnel performing the tasks and percentage of time spent performing.

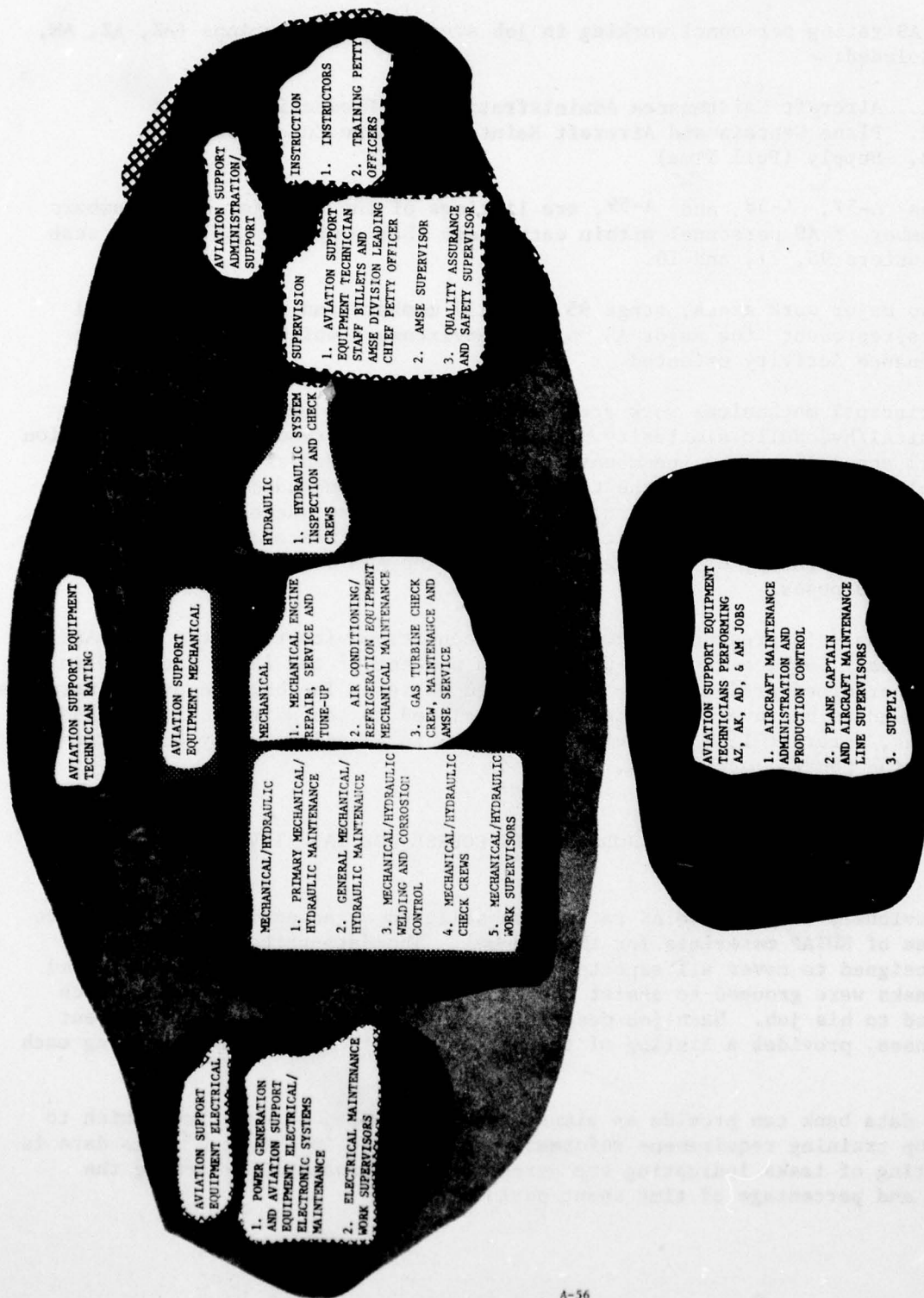


FIGURE A-56 AVIATION SUPPORT EQUIPMENT TECHNICIAN RATING

PERCENT OF NOTAPS POPULATION 12.36%
 JOB AREA TITLE AS ELECTRICAL MAINTENANCE (STAGE 95)
 AVG. PERCENT TIME SPENT ON LISTED DUTIES 57.69

STAGE NO.	POPULATION	AVG. % TIME SPENT BY MEMBERS IN BELOW LISTED DUTIES										TOTAL OF LISTED DUTIES	REMARKS (GRAND TOTAL)
		U	Z	S	T	F	P						
267	15	10.80	15.24	9.29	10.40	16.67	6.67	69.17	J-5.70%			74.87	
667	30	17.02	7.76	15.41	12.7	7.81		60.70	J-5.91%			66.61	
211	93	17.76	7.34	16.50	13.98	7.12	6.24	68.94	C-6.08%			75.02	
445	12	13.24	9.79	11.58	9.76		7.20	49.57	J-6.81 D-5.38			61.76	
310	29	20.91	5.62	17.96	19.18	5.74	7.30	81.71	D-5.39			87.10	
180	16	7.16	9.20			12.36	7.41	36.13	D-9.83 R-14.35 C-7.86			68.17	
114	09	7.94	13.65			7.65	8.40	37.64	J-7.03 L-7.57 Y-5.36			50.60	

U - AMSE Miscellaneous Electrical Systems
 Z - AMSE Service, Batteries, etc.
 S - Power Generating Systems
 T - Electrical/Electronic Trouble Shooting
 F - AMSE Inspections and Safety
 P - General AMSE Maintenance
 R - Gas Turbine Engines
 D - AMSE Maintenance Administration/Production Control
 C - Supply
 J - Welding/Corrosion Control
 L - Air Conditioning/Refrigeration
 Y - Hydraulic Systems/Brake Systems

FIGURE A-57 BREAKDOWN OF AS ELECTRICAL MAINTENANCE (STAGE 95)

JOB AREA TITLE AS MECHANICAL/HYDRAULIC MAINTENANCE (STAGE 71)

PERCENT OF

NOTAPS POPULATION 50.6%

AVG. PERCENT TIME

SPENT ON LISTED DUTIES 51.503%

STAGE NO.	POPULATION	AVG. % TIME SPENT BY MEMBERS IN BELOW LISTED DUTIES								TOTAL OF LISTED DUTIES		REMARKS	(GRAND TOTAL)
		F	Z	J	P	Y	X						
745	30	10.16	7.18	9.27	6.47	9.69	6.28	49.05				W-7.96	57.01
720	52	8.90	5.95	7.37	5.19	7.46	4.67	39.54				D-7.96 C-6.90 W-5.85	60.25
399	76	10.58	9.81	9.11	7.02	9.70	8.64	54.86				W-8.56	63.42
334	42	12.52	9.84	8.67	6.30	5.55	3.48	46.36				U-9.80 S-8.55 T-7.27	71.98
249	28	10.46	5.67	5.95	4.44	3.68	4.70	34.90				D-10.88 C-10.32 U-7.06 S-6.53	69.69
188	90	7.90	11.58	4.06	6.57	6.03	14.76	50.90				W-12.85 V-8.17	71.92
128	150	15.58	9.04	13.00	9.09	16.12	1.80	64.63				C-5.14 D-4.65	74.42
88	39	23.55	18.58	6.88	7.76	6.46	8.56	71.79				D-4.54	76.33

- F - AMSE Inspections and Safety
- Z - AMSE Service, Battery, etc.
- J - Welding/Corrosion Control
- P - General AMSE Maintenance
- Y - Hydraulic Systems/Brake Systems
- X - Engine Tune-up, Ignition Systems & Governor Control Systems
- C - Supply
- D - AMSE Maintenance Administration/Production Control
- S - Power Generating Systems
- T - Electrical/Electronic Trouble Shooting
- U - AMSE Miscellaneous Electrical Systems
- V - Transmission/Cooling Systems
- W - Engine Components (Diesel, Gasoline)

FIGURE A-58 BREAKDOWN OF AS MECHANICAL/HYDRAULIC MAINTENANCE (STAGE 71)

PERCENT OF
NOTAFS POPULATION 26.98

AS
JOB AREA TITLE SUPERVISOR/INST/PLANE CAPT/SUPPLY/ADMIN (STAGE 10)

AVG. PERCENT TIME
SPENT ON LISTED DUTIES 70.96

STAGE NO.	POPULATION	AVG. % TIME SPENT BY MEMBERS IN BELOW LISTED DUTIES TOTAL OF							REMARKS	GRAND TOTAL
		D	M	F	C	B	A	LISTED DUTIES		
69	37	4.39	17.0	6.46	4.32	49.3	5.38	86.87		86.87
73	70	24.4	17.9	10.8	11.2	9.05	9.88	83.30		83.30
209	45	28.2	19.3	8.30	13.0	8.10	11.1	88.00		88.00
21	47	32.3	14.3	7.69	7.64	2.50	23.5	87.93	N-7.04	94.97
35	96	10.9	6.57	17.4	3.95	4.33	7.83	50.94	E-21.10 J-5.42 Z-9.66	87.12
75	48	14.0	9.55	15.7	5.23	6.31	10.8	61.57	E-12.58 Z-8.10	82.25
77	26	5.25	2.36	12.5	2.11	2.32	4.99	29.57	E-46.80 J-6.05 Z-7.97	90.39
38	25	13.4	3.71	3.13	64.7	2.76	1.81	79.49		79.49

D - AMSE Maintenance Administration/Production Control
M - General Administration
F - AMSE Inspections and Safety
C - Supply
B - Training
A - Directing and Implementing
N - General Military Functions
E - Aircraft Servicing/Plane Captain
J - Welding/Corrosion Control
Z - AMSE Service, Battery, Etc.

FIGURE A-7J) BREAKDOWN OF AS SUPV/INST/PLANE CAPT/SUPPLY/ADMIN (STAGE 10)

1.3.1 UTILIZATION OF "PERCENT OF MEMBERS PERFORMING" OPTION IN THE DETERMINATION OF VALID COURSE JOB TASKS

One of the major criteria presently used to determine the validity of a job task is that insofar as possible the item should be performed and/or required to be performed by a majority of personnel in a rate (paygrade). Experimentation with performance cut-off points of 40, 30, and 20 percent involvement showed that the twenty percent cut-off provided a greater number of tasks which were more representative of the skills and work required in a rating.

A twenty percent cut-off established for a rating survey is not necessarily intended to be the baseline to be applied to all Naval ratings. The Job Task Inventories of each rating must be evaluated by subject-matter specialists to determine the percentage cut-off point that should be established to provide adequate coverage of rating skill requirements. The occupational scope of Navy ratings varies as well as the occupational complexity. In this connection, Naval training activities which have utilized NOTAP data as a basis for revising training courses, have used cut-off points from fifteen to thirty percent to isolate potential training tasks.

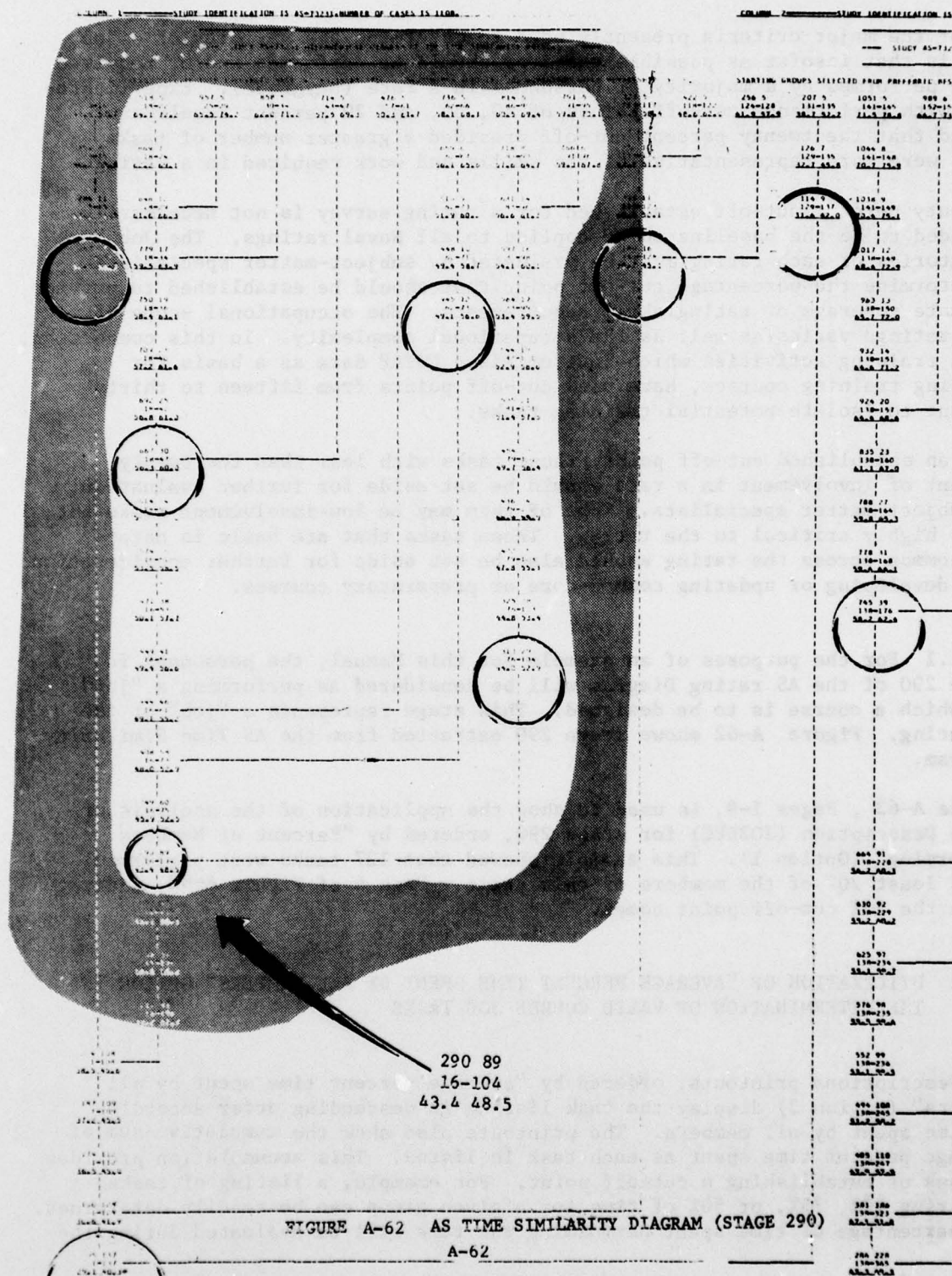
With an established cut-off point, those tasks with less than the twenty percent of involvement in a rate should be set aside for further evaluation by subject-matter specialists. Some of them may be low-involvement tasks but tasks highly critical to the rating. Those tasks that are basic in nature and common across the rating should also be set aside for further consideration when developing or updating common-core or preparatory courses.

1.3.1.1 For the purposes of an example for this Manual, the personnel in Stage 290 of the AS rating Diagram will be considered as performing a "job" for which a course is to be designed. This stage represents a "job" of the AS rating. Figure A-62 shows stage 290 extracted from the AS Time Similarity Diagram.

Figure A-63, Pages 1-9, is used to show the application of the analysis of a Job Description (JOBDEC) for stage 290, ordered by "Percent of Members Performing" (Option 1). This example showed that 127 tasks were performed by at least 20% of the members of this stage. Page 4 of Figure A-63 indicates where the 20% cut-off point comes.

1.3.2 UTILIZATION OF "AVERAGE PERCENT TIME SPENT BY ALL MEMBERS" OPTION IN THE DETERMINATION OF VALID COURSE JOB TASKS

Job Descriptions printouts, ordered by "average percent time spent by all members" (option 3) display the task listing in descending order according to time spent by all members. The printouts also show the cumulative sum of average percent time spent as each task is listed. This accumulation provides a means of establishing a cut-off point. For example, a listing of tasks requiring 70%, 75%, or 80% of time for a given group can be readily determined. The percentage of time spent performing the task will be evaluated during the



AVIATION SUPPORT EQUIPMENT TECHNICIAN JOB DESCRIPTION BY OVERLAP STAGE NUMBER
 TASK JOB DESCRIPTION: CASES- 1108- TASKS- 421- DUTIES- 22- MEMBERS- 89
 SELECTED FROM: THE HIERARCHY POSITIONS 16 THROUGH 104- FORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

		COUNT OF DUTIES OR TASKS LISTED			
		CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS			
		AVERAGE PERCENT TIME SPENT BY ALL MEMBERS			
		AVERAGE PERCENT TIME SPENT BY MEMBERS PERFORMING			
		ORDERED BY..PERCENT OF MEMBERS PERFORMING			
D-TSK		1	2	3	N
TASK TITLE		1	2	3	N
N 4	HOLD FIELD DAY/SHOP CLEAN UP	100.00	1.61	1.61	1.61
U 8	REPLACE GSE ELECTRICAL WIRING	59.88	1.63	1.61	3.22
T 8	TAKE VOLTAGE READINGS	59.88	1.61	1.79	5.01
T 9	USE WIRING DIAGRAM	97.73	1.76	1.72	6.73
T 10	USE SCHEMATIC DIAGRAM	57.13	1.64	1.80	8.53
D 12	FILL OUT MAINTENANCE ACTION FORMS (MAFIST)	97.73	1.73	1.69	10.22
S 3	CHANGE VOLTAGE REGULATORS ON POWER GEN SYS	95.50	1.41	1.35	11.57
U 10	SPLICE ELECTRICAL WIRES	95.50	1.58	1.24	13.06
Z 5	REPLACE BATTERIES IN EQUIPMENT	95.50	1.42	1.34	14.41
U 18	REPLACE KNORR LIGHTS, FUSES, ETC.	95.50	1.54	1.47	15.88
T 6	MEASURE RESISTANCE	95.50	1.60	1.53	17.41
T 7	PERFORM CONTINUITY CHECKS	95.50	1.65	1.76	19.18
S 2	CHANGE GENERATORS/ALTERNATORS ON POWER GEN SYS	93.26	1.43	1.33	20.51
S 12	ADJUST FREQUENCY ON ELECTRICAL POWER UNITS	93.26	1.38	1.29	21.80
S 14	CHANGE ELECTRICAL POWER CABLE HEADS	53.42	1.44	1.36	23.14
P 3	REPLACE GAUGES ON GSE (ELECT., HYDR., PNEUMATIC, ETC.)	53.42	1.50	1.45	24.59
S 13	REPLACE/REPAIR COMPONENTS OF ELECT POWER CABLE HEADS	52.13	1.46	1.35	25.94
U 6	CHANGE AUTOMOTIVE ALTERNATORS/GENERATORS ON GSE	91.01	1.43	1.30	27.24
S 17	REPLACE INDIVIDUAL ELECTRONIC/ELECTRICAL COMPONENTS	91.01	1.44	1.31	28.55
U 4	CHANGE ANTIQUIQUE VOLTAGE REGULATORS ON GSE	82.88	1.28	1.24	29.79
U 5	REMOVE/REPLACE STARTERS ON GSE	89.88	1.64	1.47	31.26
U 2	REPLACE ELECTRIC MOTORS ON GSE	66.78	1.56	1.21	32.47
F 5	CHECK LOAD BANK FOR PROPER OPERATION	85.39	1.22	1.05	33.52
U 17	INSTALL SENDING UNITS	85.39	1.15	1.02	34.54
S 15	CHANGE ELECTRICAL POWER UNIT CABLES	84.27	1.10	0.92	35.46
P 9	REPLACE COMMON HARDWARE (SCREWS, FASTENERS, BOLTS, ETC.)	84.27	1.25	1.14	36.60
S 11	ADJUST UPPER AND LOWER VOLTAGE LIMITS ON POWER UNITS	79.77	1.28	1.02	37.61
T 3	TAKE CURRENT READINGS	79.77	1.36	1.08	38.69
P 14	INCORPORATE SERVICE CHARGES ON GSE	79.77	1.54	1.22	39.92
D 11	FILL OUT SUPPORT ACTION FORMS (SAFES)	79.77	1.20	0.94	40.87
T 4	MEASURE FREQUENCY	78.65	1.36	1.07	41.94
F 8	PERFORM OPERATIONAL CHECK ON GSE TO VERIFY DISCREPANCY	78.65	1.64	1.29	43.23
S 27	VISUALLY INSPECT GSE FOR APPARENT MALFUNCTIONS	78.65	1.39	1.10	44.33
S 5	CLEAN SLIP RINGS	77.53	1.07	0.83	45.16
U 9	SPOT TIE WIRING	77.53	1.21	0.94	46.10
S 1	REPLACE COMPONENT PARTS ON VOLTAGE REG OF POWER GEN SYS	76.40	1.28	0.93	47.08
P 10	TIGHTEN LOOSE SCREWS, Dzus FASTENERS, ETC.	76.40	1.28	0.93	48.05
T 12	TROUBLESHOOT EQUIP BY SUBSTITUTION OF KNOWN GOOD PARTS	75.28	1.12	0.84	48.89
U 11	ADJUST VOLTAGE REGULATORS	74.16	1.15	0.88	49.77
U 14	REBUILD STARTERS BY REPLACING COMPONENT PARTS	74.16	1.25	0.92	50.70
T 11	USE BLOCK DIAGRAM	71.91	1.07	0.77	51.46

FIGURE A-63 Page 2 A-64

O-TSK	TASK TITLE	2				3				N			
		***	70.78	1.01	0.72	52.18	70.78	1.01	0.72	52.18	70.78	1.01	0.72
S 6	STONE COMMUTATORS												
Z 6	SERVICE BATTERIES												
U 15	REBUILD AUTOMOTIVE GENERATORS BY REPLACING COMP. PARTS												
U 16	REBUILD AUTOMOTIVE ALTERNATORS BY REPLACING COMP. PARTS												
Z 1	CLEAN BATTERY CASES												
S 18	FABRICATE/REPAIR INTERCONNECTING ELECTRICAL CABLES												
S 19	REPLACE CANNON PLUGS												
R 1	ADJUST ENGINE OVER-SPEED SWITCHES												
C 11	ORDER PARTS/SUPPLIES												
U 3	REBUILD ELECTRIC MOTORS (REPLACE ARMATURES, WINDINGS, ETC.)												
S 7	REBUILD GENERATORS/ALTERNATORS ON POWER GEN SYS												
T 1	IDENTIFY COMPONENTS/CIRCUITRY OF ELECT. EQUIP LACKING SCHEM.												
Z 7	CHARGE BATTERIES												
Z 11	TAKE METER READINGS ON GSE												
J 6	SOFT SOLDER GSE COMPONENTS												
U 19	CHANGE ELECTRIC MOTORS ON DRIVE AXLES												
J 14	CLEAN ELECTRIC/ELECTRONIC EQUIPMENT USING SOLVENT												
C 15	RESEARCH PUBLICATIONS TO OBTAIN SUPPLY DATA												
S 4	REBUILD RELAYS												
O 10	FILL OUT TECHNICAL DIRECTIVE COMPLIANCE (TDC) FORMS												
P 4	REPAIR CABLE/MOUSE REELS												
Z 15	FUEL GSE												
C 14	INVENTORY TOOLS/EQUIPMENT/SUPPLIES												
Z 2	PREPARE NEW BATTERIES FOR SERVICE												
S 16	BUILD-UP ELECTRICAL POWER CABLES												
C 20	PLACE IDENTIFYING MARKS ON TOOLS/EQUIPMENT												
V 4	REPLACE DRIVE BELTS ON GSE (FAN, PUMPER STEERING, ETC.)												
F 17	PERFORM DAILY INSPECTION ON GSE												
C 1	UNCRATE EQUIPMENT												
A 3	ENSURE WORK ASSIGNMENTS ARE COMPLETED												
T 2	DRAW SCHEMATIC DIAGRAMS												
P 15	APPLY PRESERVATIVES TO ELECTRICAL/ELECTRONIC COMPONENTS												
P 1	SAFETY WIRE EQUIPMENT												
E 16	PERFORM ACCEPTANCE CHECKS ON GSE												
J 16	WASH GSE												
X 9	INSTALL GOVERNORS ON GSE												
C 13	PICK UP/TURN IN PARTS AND SUPPLIES												
S 10	ADJUST TRANSFORMER RECTIFIER UNITS												
T 5	MEASURE CAPACITANCE												
X 19	ADJUST ENGINE GOVERNORS												
U 7	CHANGE GSE BLOWER MOTORS												
O 4	FILL OUT WORK REQUEST/WORK ORDERS												
C 4	FILL OUT SUPPLY ACQUISITION FORMS												
S 4	REPAIR ADAPTERS/REELS ON PRINTED-CIRCUIT BOARDS												
S 9	REPAIR TRANSFORMER RECTIFIER UNITS												
F 6	PARTICIPATE IN "FOU" WALKDOWN												
Z 16	MAKE ROAD CALLS												
J 17	INSPECT GSE FOR CORROSION												
X 0	REMOVE/REPLACE GOVERNOR ACTUATORS												
A 4	DIRECT (SUPERVISE) WORK IN PROGRESS												
O 9	DRAFT UNSATISFACTORY REPORTS (USS)												

FIGURE A-63, Page 3

C-TSK	TASK TITLE	W	Y	N
U 12	UNDERCUT ARMATURES	31.46	0.78	0.24
L 8	CHANGE AIR CONDITIONER ELECTRICAL COMPONENTS	31.46	0.93	0.29
A 2	ASSIGN WORK LOADS	32.24	1.32	0.21
N 3	PARTICIPATE IN MEETINGS (SEC LDR, SAFETY, MAINT, ETC.)	32.24	0.05	0.26
J 18	SPECT REMOVED GSE COMPONENTS TO DETERMINE REPAIR CAPABILITY	30.34	1.54	0.31
C 18	SCREEN DEFECTIVE COMPONENTS TO DETERMINE REPAIR CAPABILITY	29.21	1.14	0.35
C 22	COMPLETE/ATTACH EQUIPMENT STATUS TAGS (REF, NON-REF, BCM)	29.21	0.84	0.24
C 10	STOW/BREAK OUT PARTS, SUPPLIES, EQUIPMENT	28.09	1.01	0.28
N 6	PAINT WORKING/LIVING SPACES	28.09	1.13	0.32
Z 12	LUBRICATE/GREASE GSE	28.09	0.76	0.21
B 3	INSTR. PENS. IN SAFETY PRACT. PERT TO OPER & MAINT OF GSE	28.09	1.03	0.29
J 10	MANUFACTURE SPECIAL TOOLS/EQUIPMENT	26.96	0.69	0.13
O 24	ISSUE/RECEIVE GSE ON SUBJ. LIST/DY	26.96	0.82	0.25
T 13	RESEARCH PUBLICATIONS FOR TECHNICAL INFORMATION	25.84	1.30	0.34
Z 19	CHANGE FILTERS ON GSE ENGINES (FUEL, AIR, OIL, ETC.)	25.84	0.78	0.20
A 1	ASSIGN WORK PRIORITY	24.72	0.81	0.20
J 1	APPLY REFLECTIVE TAPE ON GSE	24.72	0.75	0.18
C 3	SCREEN PARTS/EQUIPMENT RECEIVED FROM SUPPLY	24.72	0.24	0.24
U 13	TURN ARMATURES	23.59	0.88	0.21
Z 3	NEUTRALIZE BATTERIES	23.59	0.59	0.22
F 2	CONDUCT GENERAL SAFETY INSPECTIONS OF EQUIPMENT/SPACES	23.59	0.93	0.22
O 21	REVIEW 3-M SOURCE DOCUMENTS (MAF'S, SAF'S, IOL'S)	23.59	1.20	0.28
Y 4	ADJUST BRAKES ON GSE	22.47	0.73	0.16
Z 14	ADJUST MECHANICAL LINKAGES	22.47	0.72	0.16
F 1	ENSURE COMPLIANCE WITH SAFETY MESSAGES/DIRECTIVES	21.35	0.99	0.21
P 20	BLEED FUEL SYSTEM	21.35	0.74	0.16
X 18	CHANGE SPARK PLUGS IN GSE	21.35	0.77	0.16
L 2	PERFORM PRE CHECKS ON AIR CONDIT/REFRIG. SYSTEMS	21.35	0.50	0.19
B 13	PREPARE TRAINING LECTURES	20.22	0.73	0.14
K 6	CHANGE TIRES ON GSE	20.22	0.62	0.12
C 8	CRATE EQUIPMENT FOR SHIPMENT	20.22	0.69	0.14
N 12	MAINTAIN PERSONNEL TIME SHEETS	20.22	0.69	0.14
E 11	PERFORM 100-HOUR INSPECTION ON GSE	20.22	1.04	0.21
Y 14	BLEED BRAKE SYSTEMS ON GSE	20.22	0.26	0.26
X 15	CHANGE MOTOR ON GSE IGNITION SYSTEM	20.22	0.74	0.15
L 1	SILVER SOLDER GSE COMPONENTS	19.10	0.68	0.14
J 8	PERFORM STRUCTURAL REPAIR ON GSE (WELD, STRAIGHTEN, ETC.)	19.10	0.99	0.17
E 21	PERFORM 90-DAY INSPECTION ON GSE	19.10	0.73	0.13
X 14	CHANGE DISTRIBUTOR CAP ON GSE	19.10	0.58	0.18
X 17	CHANGE IGNITION POINTS IN GSE	19.10	0.63	0.12
L 3	IDENTIFY MALFUNCTION MECH COMPON OF AIR CONDITIONING SYS	19.10	0.84	0.12
L 10	CHECK AIR CONDITIONING SYSTEMS FOR LEAKS	19.10	0.78	0.15
Z 8	REPACK WHEEL BEARINGS	19.10	0.73	0.15
C 19	MAKE SILVERAGE RUNS FOR SPARE PARTS	17.98	0.72	0.13
D 1	MAINTAIN STATUS BOARDS	17.98	0.94	0.17
F 14	PERFORM 500 HOUR INSPECTION ON GSE	17.98	1.05	0.19
D 6	FILL OUT ORGANIZATIONAL REGISTER	17.98	1.44	0.26
X 16	CHANGE CONDENSER ON GSE IGNITION SYSTEM	17.98	1.14	0.20
L 4	CHANGE REFRIGERATION/AIR CONDITIONING SYSTEMS	17.98	0.64	0.11
X 1	REBUILD ENGINE OVER-SPEED CONTROL	17.98	0.80	0.14
J 24	REMOVE CORROSION MECHANICALLY (WIRE BRUSH, TYCO WHEEL, ETC)	16.85	0.96	0.16
		16.85	0.84	0.14

FIGURE A-63, Page 4 A-66

D-TASK	TASK TITLE	Z	2	3	N
M 11	ADJUST FUEL RACK ON DIESEL ENGINES	16.85	0.76	0.13	88.84
L 7	CHANGE AIR CONDITIONER TECH. COMPONENTS (LINES, VALVES, ETC.)	16.85	0.76	0.11	88.84
N 5	PARTICIPATE IN "SELF HELP" PROGRAM	15.73	1.03	0.17	85.11
A 6	CONSOLE PERSONNEL CONCERNING MILITARY/PERSONAL MATTERS	15.73	0.67	0.10	89.22
F 12	PERFORM 200 HOUR INSPECTION ON GSE	15.73	1.30	0.20	89.42
D 14	MAINTAIN VIDS BOARDS	15.73	0.52	0.14	89.57
X 5	PERFORM ENGINE TUNING	15.73	0.63	0.13	85.66
Z 21	CHANGE OIL IN GSE ENGINES	15.73	0.73	0.12	88.78
J 7	CUT METAL USING OXYACETYLENE EQUIPMENT	14.60	0.60	0.08	88.86
P 13	CHANGE MECH LINKAGE CABLES (HAND BRAKE, SAFETY LATCH, ETC.)	14.60	0.74	0.11	88.86
M 1	PREPARE ENLISTED PERFORMANCE EVALUATIONS	14.60	1.01	0.14	94.11
D 7	ELL-DUI VISUAL IDENTIFICATION DISPLAY SYSTEM (VIDUS) CAPDS	14.60	0.64	0.12	94.21
C 17	ORDER OPEN PURCHASE ITEMS	14.60	0.69	0.13	92.36
C 23	PREPARE WAITING PARTS (AMP) REPORTS	14.60	1.08	0.16	90.52
X 13	REMOVE/REPLACE DISTRIBUTORS ON GSE	14.60	0.67	0.13	90.61
B 1	CONDUCT FORMAL CLASSROOM/OPERATIONAL TRAINING FOR LICENSING	14.60	0.86	0.12	90.74
E 4	POST SAFETY MATERIAL	13.48	0.84	0.11	90.85
Z 4	POUR BATTERY TERMINALS	13.48	0.76	0.10	90.95
C 5	FOLLOW UP SUPPLY REQUIREMENTS	13.48	0.87	0.12	91.07
V 3	REPLACE COMPONENT PARTS IN DIFFERENTIALS (GEARS, ETC.)	13.48	0.74	0.10	91.16
M 1	FLUSH GSE FUEL TANKS	13.48	0.60	0.08	91.24
Z 13	PERFORM 400 HOUR INSPECTION ON GSE	13.48	1.22	0.16	91.41
D 20	FILL OUT MAN HOUR ACCOUNTING (MHA) CARDS	13.48	0.95	0.13	91.53
D 22	REVIEW 3-M PRINTOUTS/READOUTS	13.48	0.88	0.12	91.65
M 5	CHANGE FLY WHEELS ON GSE	13.48	0.84	0.11	91.76
Z 20	SERVICE COOLING SYSTEMS WITH ANTI-FREEZE	13.48	0.73	0.10	91.86
L 11	ADJUST EXHAUST VALVE/PRESSURE SWITCHES ON A/C SYSTEMS	13.48	0.53	0.09	91.92
J 3	OXYACETYLENE WELD GSE COMPONENTS	12.36	0.74	0.09	92.01
K 2	BREAK DOWN/BUILD UP TIRES	12.36	0.58	0.07	92.03
Z 17	CLEAN FILTERS ON GSE	12.36	0.72	0.09	92.17
P 12	SHARPEN DRILL BITS	12.36	0.66	0.08	92.25
E 20	PERFORM 180 DAY INSPECTION ON GSE	12.36	0.81	0.10	92.35
F 23	PERFORM 60 DAY INSPECTION ON GSE	12.36	0.83	0.11	92.45
F 24	PERFORM 30 DAY INSPECTION ON GSE	12.36	0.96	0.12	92.57
F 26	PERFORM QA INSPECTIONS	12.36	1.39	0.17	92.75
D 16	MAINTAIN LOGS/RECORDS/BATTERY ISSUE, SUPPLY, EQUIP, ETC.)	12.36	0.95	0.12	92.86
D 5	SCREEN AFFAIRING PARTS (APPL) LIST	12.36	1.01	0.12	92.92
U 1	REPAIR EXPLOSIVE PROOF ELECTRICAL SWITCHES	12.36	1.02	0.12	93.11
Y 1	CHANGE BRAKE SHOES	12.36	0.60	0.07	93.18
L 5	EVACUATE REFRIGERATION/AIR CONDITIONING SYSTEMS	12.36	0.71	0.08	93.27
J 4	ARC WELD GSE COMPONENTS	11.23	0.75	0.08	93.35
Z 13	LUBRICATE TECH. COMPONENTS (GEARS, CAMS, LEVERES, ETC.)	11.23	0.59	0.12	93.41
C 1	QUALIFY/CALIBRATE GAUGES	11.23	0.60	0.09	93.50
C 2	DETERMINE PROCUREMENT SOURCE OF PARTS/SUPPLIES (NAVY, OPEN)	11.23	0.94	0.13	93.60
D 13	SCREEN MAINT REQ CARD (MRC) DECK FOR ACCURACY/COMPLETENESS	11.23	1.00	0.11	93.71
M 8	SUBMIT BENEFICIAL SUGGESTIONS (OWNY SUGS)	11.23	0.66	0.06	93.78
X 3	IDENTIFY/RELOCATE COMP. OF INTERNAL COMPUSI ENGINES	11.23	0.60	0.06	93.84
V 5	REPLACE WATER HOSES ON GSE (RADIATOR, HEATER, ETC.)	11.23	0.74	0.08	93.92
X 10	CHANGE MAGNETS ON GSE	11.23	0.68	0.08	94.00
Z 25	REMOVE/REPLACE GSE ENGINES	11.23	0.07	0.07	94.07
V 1	REMOVE AND REPLACE AXLES ON GSE	10.11	0.61	0.06	94.13

Q-TASK	TASK TITLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
P 11	INSTALL HQQC LATCHES	10-11	0-36	0-06	94-19	195																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

FIGURE A-63, Page 6

D-TSK	TASK TITLE	%	Z	N
M 20	INSTALL ETHER SYS ON DIESEL ENG (CHEVRON SYSTEM)	5.62	0.66	96.98
K 3	REPAIR TIRE INNER-TUBES	5.62	0.48	97.01
B 6	ADMINISTER TESTS/EXAMINATIONS	5.62	1.02	97.06
V 13	REMOVE/REPLACE WATER PUMPS ON GSE	5.62	0.49	97.09
R 15	UPDATE TOOL MATERIALS/ISSN GUIDES, PLANS, ETC.)	5.62	3.56	97.11
R 13	REMOVE/REPLACE DUCT ASSEMBLY ON GTC UNIT	4.49	1.00	97.16
M 3	ISSUE GSE DRIVERS LICENSES	4.49	1.19	97.21
Y 16	CHANGE HYDRAULIC LINES ON GSE	4.49	0.47	97.23
Y 5	REMOVE/REPLACE BRAKE DRUMS	4.49	0.35	97.24
E 21	PERFORM NA AUDITS	4.49	1.03	97.29
D 15	FOLLOW UP ON UN'S	4.49	0.68	97.32
C 12	ISSUE TOOLS/EQUIPMENT/SUPPLIES	4.49	1.17	97.37
O 17	ANALYZE MAINTENANCE DATA TO DETERMINE TRENDS	4.49	0.72	97.40
Z 9	PRESSURE CHECK TINES USING PRESSURE CHAMBER(SAFETY CAGE)	4.49	0.91	97.44
B 5	MAKE/REPAIR/REPLACE TRAINING AIDS	4.49	0.97	97.48
N 9	SCREEN/EVALUATE BENEFICIAL SUGGESTIONS	4.49	0.73	97.51
K 7	CHANGE SHOCKS ON GSE	4.49	0.55	97.54
J 21	PRIME/PAINT GSE	4.49	0.70	97.57
E 14	DIRECT AIRCRAFT USING STANDARD AIRCRAFT TAXI SIGNALS	4.49	0.71	97.59
M 5	REBUILD/REPAIR CARBURETOR	4.49	0.76	97.63
C 9	PACKAGE DELICATE EQUIPMENT FOR SHIPMENT	4.49	0.73	97.66
K 1	CHANGE LEAF SPRINGS	4.49	0.65	97.69
M 15	REMOVE/REPLACE ENGINE HEADS ON GSE	4.49	0.75	97.72
M 2	VALIDATE GROUND SUPPORT EQUIPMENT (GSE) OPERATOR'S LICENSES	4.49	0.96	97.76
R 17	MAINTAIN FILES (CUSTODY CARDS, MESSAGES, ETC.)	4.49	1.13	97.81
X 23	CHECK/TEST DIESEL FUEL INJECTORS FOR PROPER SETTING	4.49	0.56	97.83
B 12	PREPARE TESTS/EXAMINATIONS	4.49	0.61	97.85
E 8	TUN AIRCRAFT	4.49	0.55	97.88
L 12	ADJUST THERMOSTAT/COOLING WATER REG ON AIR COND SYS	4.49	0.62	97.90
C 21	CHANGE HYDRAULIC FLUID IN GSE	3.37	0.43	97.91
Y 25	FRESH HYDRAULIC SYSTEMS	3.37	0.76	97.94
Y 4	CLEAN BRAKES	3.37	0.65	97.97
B 7	GRADE TESTS/EXAMINATIONS	3.37	1.02	98.00
P 16	CHANGE CASTERS ON GSE	3.37	0.64	98.02
O 21	WRITE REVISIONS TO EQUIPMENT OPERATING INSTRUCTIONS	3.37	0.62	98.04
K 3	REMOVE/REPLACE COMBUSTION GANS ON GTC	3.37	0.77	98.06
M 13	ADUITE CORRESPONDENCE (REPORTS, MESSAGES, ETC.)	3.37	0.60	98.08
M 14	MAINTAIN "REQUIRED READING" BOARDS	3.37	0.42	98.09
J 19	STRIP PAINT FROM GSE SURFACE	3.37	0.71	98.12
M 1	CHECK/CL. JUNE INSTRUCTIONS	3.37	0.52	98.15
M 2	CRINO ENGINE VALVES/SEATS	3.37	0.43	98.16
V 7	REPAIR RADIATORS	3.37	0.43	98.17
M 14	REMOVE/REPLACE FUEL INJECTOR NOZZLES	3.37	0.47	98.18
F 30	TEST 6 VALVE EXPERIMENTAL EQUIPMENT/PROCEDURES	3.37	0.61	98.20
M 18	REMOVE/REPLACE MOTOR/ENGINE MOUNTS ON GSE	3.37	0.64	98.21
M 19	REMOVE/REPLACE ENGINE OIL PUMPS ON GSE	3.37	0.64	98.21
R 5	REPLACE DIAPHRAGMS IN FUEL CONTROL UNIT	3.37	0.58	98.25
Y 11	MANUFACTURE RIGID LINES (MAKE-UP)	3.37	0.65	98.28
E 1	MANUFACTURE FLEXIBLE LINES (MAKE-UP)	3.37	0.41	98.29
E 11	BIDE AIRCRAFT BRAKES	3.37	1.13	98.33
M 27	ADJUST ENGINE VALVES	3.37	0.49	98.34

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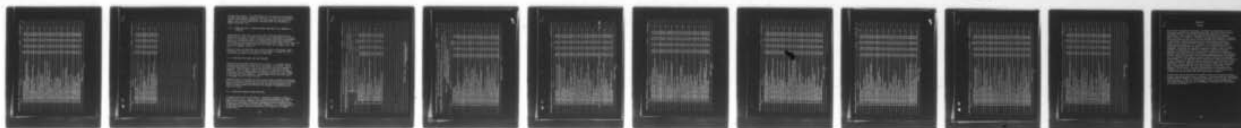
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O-TSK	TASK TITLE	Z	%	T	M

P 18	REMOVE/REPLACE SEATS ON GSE	3.37	0.28	0.01	98.35
J 2	HELI ARC WELD GSE COMPONENTS	2.24	0.26	0.00	98.35
O 16	RECOMMEND TEST/OPERATIONAL PROCEDURES FOR PUBLICATIONS	2.24	0.60	0.01	98.37
O 26	TELL UNIT AVIATION MAINT SUPPORT EQUIP LABEL DATA CARDS	2.24	1.25	0.02	98.39
E 7	CONNECT AIR CONDITIONER TO AIRCRAFT	2.24	0.47	0.01	98.39
Y 24	REBUILD HYDRAULIC RAMS/ACTUATORS	2.24	0.54	0.01	98.41
J 27	WASH AIRCRAFT	2.24	0.86	0.02	98.42
M 16	DRAFT MESSAGES/CORRESPONDENCE	2.24	0.54	0.01	98.43
E 28	PERFORM MAGNETIC PARTICLE INSPECTIONS (MAGNA FLUX)	2.24	1.33	0.03	98.46
N 4	REPAIR DIESEL INJECTOR	2.24	0.28	0.00	98.47
R 4	REMOVE/REPLACE TAIL CONES TO GTC	2.24	0.51	0.01	98.47
E 2	PUSH AIRCRAFT	2.24	1.12	0.02	98.50
K 10	REMOVE/REPLACE POWER STEERING PUMPS	2.24	0.20	0.00	98.50
Y 10	CHANGE GEAR DRIVE TRANSFER CASE ON POWER UNITS	2.24	0.53	0.01	98.51
N 8	CHANGE ENGINE GASKETS	2.24	0.35	0.00	98.51
M 12	RESET FUEL INJECTOR NOZZLE (CALIBRATE)	2.24	0.69	0.01	98.53
E 19	SERVICE AIRCRAFT HYDRAULIC SYSTEMS	2.24	1.87	0.04	98.57
M 17	REMOVE/REPLACE ENGINE MANIFOLDS ON GSE	2.24	0.40	0.01	98.57
K 12	ADJUST MANUAL STEERING UNITS	2.24	0.61	0.01	98.59
F 18	PERFORM 500 START INSPECTION ON GAS TURBINE COMPRES (GTCT)	2.24	1.22	0.02	98.61
O 3	TEST/ADJUST SAFETY RELIEF VALVES	2.24	1.40	0.03	98.64
Y 28	CLEAN HYDRAULIC COMPONENTS (RAMS, ACTUATORS, PUMPS, ETC.)	2.24	0.60	0.02	98.65
E 12	STAND BY AIRCRAFT WITH FIRE BOTTLE	2.24	0.68	0.01	98.67
E 15	ACT AS SAFETY OBSERVER DURING ACFT MOVEMENT	2.24	0.28	0.01	98.68
B 2	SCHEDULE TRAINING	2.24	1.27	0.03	98.71
Y 26	REBUILD TOWERHAULT GSE ENGINES	2.24	0.61	0.01	98.72
E 4	FUEL/OIL AIRCRAFT	2.24	1.05	0.02	98.74
E 16	CHANGE TIRES ON AIRCRAFT	2.24	0.60	0.02	98.75
Z 18	CHANGE DRUMS ON LUBRICATING UNIT	1.12	0.22	0.00	98.75
B 5	PROG/READ/SCREEN LESSON GUIDES	1.12	1.16	0.01	98.77
R 15	REMOVE/REPLACE HEAT SHIELD ON GTC	1.12	1.56	0.02	98.78
Y 19	PRESSURE CHECK HYDRAULIC SYSTEMS	1.12	0.25	0.00	98.78
Y 13	BLEED HYDRAULIC SYSTEMS ON GSE	1.12	0.76	0.01	98.79
M 3	CHANGE SUPERCHARGER ON DIESEL	1.12	0.24	0.00	98.79
F 29	LOAD-TEST JACKS	1.12	0.51	0.00	98.79
R 10	REMOVE/REPLACE CROSS FIRE TUBES ON GTC UNITS	1.12	0.51	0.00	98.79
P 2	ADJUST GEAR TRAINS	1.12	0.32	0.00	98.81
P 22	ADJUST DEADMAN SEAT (SAFETY SEAT) ON FORKLIFT	1.12	1.14	0.01	98.82
Y 15	REPLACE HYDRAULIC LINE QUICK DISCONNECT FITTINGS	1.12	1.33	0.01	98.83
E 20	TAKE HYDRAULIC SAMPLES	1.12	1.33	0.01	98.85
E 18	SERVICE AIRCRAFT PNEUMATIC SYSTEMS	1.12	1.36	0.01	98.86
E 9	INSTALL JURY STRUTS	1.12	1.18	0.01	98.87
V 9	CHANGE SHUTTERS ON GSE COOLING SYSTEMS	1.12	0.26	0.00	98.87
M 5	PREPARE BIRTH BILLS	1.12	2.24	0.02	98.89
Y 12	CHANGE CLUTCH PLATE/PRESSURE PLATE	1.12	0.32	0.00	98.89
E 3	STRAP PERSONNEL IN AIRCRAFT	1.12	1.18	0.01	98.91
M 15	TYPE MESSAGES/CORRESPONDENCE/FORMS	1.12	0.28	0.00	98.91
M 13	TIME INJECTOR FUEL PUMPS	1.12	0.24	0.00	98.91
Y 24	REPAIR HYDRAULIC ACCUMULATOR ASSEMBLIES	1.12	0.24	0.00	98.91
F 32	PERFORM HYDRAULIC CONTAMINATION ANALYSIS	1.12	1.33	0.01	98.92
M 16	REMOVE/REPLACE OIL PANS ON GSE	1.12	1.18	0.01	98.93

FIGURE A-63, Page 8

D-TSK	TASK TITLE	***			
		1	2	3	4
K 9	REBUILD POWER STEERING COMPONENTS	1.12	1.08	0.01	98.94
M 21	REBUILD FUEL PUMPS	1.12	1.62	0.02	98.96
P 13	REBUILD ENG. WATER GUN	1.12	1.61	0.01	98.97
Q 2	FILL AIR BOTTLES	1.12	1.36	0.01	98.99
E 17	SERVICE AIRCRAFT TIRES	1.12	1.36	0.01	99.00
F 34	TEST HYDRAULIC COMPONENTS USING AIR PRESSURE	1.12	0.27	0.0	99.00
J 12	CLEAN JACKS	1.12	1.14	0.01	99.01
M 6	PREPARE ACCIDENT REPORTS	1.12	0.98	0.01	99.02
Z 22	CHANGE AUTOMATIC TRANSMISSION FLUID	1.12	0.65	0.00	99.02
V 17	REMOVE/REPLACE TRANSMISSIONS	1.12	0.35	0.0	99.03
J 9	REPAIR GSE FUEL TANKS	1.12	1.01	0.01	99.03
V 20	ADJUST HYDRAULIC PRESSURE REGULATORS	1.12	0.25	0.0	99.03
R 6	CLEAN FITTINGS INSIDE FUEL CONTROL UNIT (AJR, EUIF)	1.12	0.25	0.0	99.03
Q 6	FILL NITROGEN CARTS	1.12	1.36	0.01	99.04
M 10	SCREEN REPORTS FOR ACCURACY/COMPLETENESS	1.12	1.40	0.01	99.05
E 5	REMOVE/REPLACE AIRCRAFT ACCESS PANELS	1.12	0.91	0.01	99.06
E 13	INSTALL/REMOVE AIRCRAFT PROTECTIVE COVERS (INTAKE, ETC.)	1.12	0.33	0.0	99.06
D 4	ADJUST PNEUMATIC PRESSURE REGULATORS	1.12	0.42	0.0	99.07
F 31	PERFORM OPERATIONAL CHECKS ON JACKS	1.12	1.14	0.01	99.08
P 8	REPLACE HORN GEARS IN MECHANICAL JACKS	1.12	0.32	0.0	99.08

FIGURE A-63, Page 9

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Training Task Analysis. Job requirements in vital areas can be identified and given added emphasis during this analysis. In order for the analysis to provide valid training requirements, the "percentage of time spent by all members" data must be considered in conjunction with the "percentage of members performing" data.

1.3.2.1 CUMULATIVE SUM OF "AVERAGE PERCENT TIME SPENT BY ALL MEMBERS" IN STAGE 290

Identifying the tasks that occupy 70% to 80% of the work time of the job incumbents in a group is a good indication of work accomplished by the group. Using a Job Description ordered by "average percent time spent by all members" (option 3), as described above, the cumulative sum (percentage) represents those tasks that occupy the majority of the group's time. Figure A-73, Pages 1-8 is a Job Description (JOBDEC) for Stage 290 ordered by "average percent time spent by all members (option 3)".

Using as a basis, a cumulative sum of 75% time spent by all members, page 3 of Figure A-73 shows that the first 80 tasks listed accounted for 75% of the average time spent by all members of stage 290.

1.3.3 DEVELOPING THE COURSE JOB TASK INVENTORY

The previous two processes described in 6.3.1 and 6.3.2 revealed that 127 tasks were performed by at least 20% of the members of stage 290. Eighty of those tasks accounted for 75% of the work time of the job incumbents in stage 290. These 80 tasks comprise the nucleus of the Course Job Task Inventory. The 47 remaining tasks performed by at least 20% of the members in stage 290 must be reviewed and, if considered appropriate, must be added to the Course Job Task Inventory. Accomplishment of the above will result in the basic Course Job Task Inventory.

Remaining tasks in the Rating Job Task Inventory must be examined to determine if their criticality requires their inclusion in the Course Job Task Inventory. When all required tasks have been included, the resulting document is the Course Job Task Inventory and Training Task Analysis to design/develop the course will begin.

1.3.4 REVIEW AND UPDATE OF NOTAP DATA BANKS

A constant review cycle of job tasks is required for training to maintain a valid "Audit Trail". There will be a continuing requirement for review of NOTAP tasks by technical experts, particularly in the area of tasks that indicate low percentages of personnel performing and low percentage of time in performance, but require critical skill capability, i.e., the necessity for an Explosive Ordnance Demolition Technician to be capable of disarming a nuclear device.

AVIATION SUPPORT EQUIPMENT	TECHNICIAN	JOB DESCRIPTION	BY	OVERLAP	STAGE	NUMBER

TASK JOB DESCRIPTION=CASES= 1108-TASKS= 421-DUTIES=22-MEMBERS= 89
SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 194-FORMED AT STAGE 250 OF GROUPING ON TIME SIMILARITY.

MEMBERSHIP CASES= 1100 TASKS= 421 MEMBERS= 29
SELECTED FROM THE HIERARCHY POSITIONS 16 THROUGH 104 FORMED AT STAGE 290 OF GROUPING ON TIME SIMILARITY.

COUNT OF OUTLIES OR TASKS LISTED.....									
CUMULATIVE SUM OF AVERAGE PERCENT TIME SPENT BY ALL MEMBERS.....									
ORDERED BY.....AVERAGE PERCENT TIME SPENT BY ALL MEMBERS.....									
AVERAGE PERCENT TIME SPENT BY MEMBERS PERFORMING.....									
PERCENT OF MEMBERS PERFORMING.....									
D-TASK	TASK TITLE	1	2	3	4	5	6	7	N
T 10	USE SCHEMATIC DIAGRAM	97.75	1.84	1.80	1.80	1.80	1.80	1.80	1.80
T 8	TAKE VOLTAGE READINGS	98.88	1.81	1.79	3.59				
T 7	PERFORM CONTINUITY CHECKS	95.50	1.85	1.76	5.36				
T 9	USE WIRING DIAGRAM	97.75	1.72	1.78					
Q 12	EEL GUT MAIN/REPLACE ACTION FORMS (MELSI)	51.75	1.73	1.64	5.76				5
N 4	HOLD FIELD DAY/SHOP CLEAN UP	100.00	1.61	1.61	10.38				
U 8	REPLACE GSE ELECTRICAL WIRING	98.88	1.63	1.61	11.98				
U 6	MEASURE RESISTANCE	95.50	1.60	1.53	13.51				
U 10	SPLICE ELECTRICAL WIRES	95.50	1.58	1.51	15.02				
U 5	REMOVE/REPLACE STARTERS ON GSE	89.88	1.64	1.57	16.49				10
U 18	REPLACE KNOPS, LIGHTS, FUSES, ETC.	95.50	1.54	1.47	17.56				
P 3	REPLACE GAUGES ON GSE (ELECT., HYDR., PNEUMATIC, ETC.)	93.26	1.50	1.45	19.42				
S 13	REPLACE/REPAIR COMPONENTS OF ELECT POWER CABLE HEADS	92.13	1.40	1.35	20.77				
S 3	CHANGE VOLTAGE REGULATORS ON POWER GEN SYS	95.50	1.41	1.35	22.12				
S 14	CHANGE ELECTRICAL POWER CABLE HEADS	93.26	1.44	1.34	23.56				15
Z 5	REPLACE BATTERIES IN EQUIPMENT	95.50	1.40	1.34	24.79				
S 2	CHANGE GENERATORS/ALTERNATORS ON POWER GEN SYS	93.26	1.43	1.33	26.43				
S 17	REPLACE INDIVIDUAL ELECTRONIC/ELECTRICAL COMPONENTS	91.01	1.46	1.31	27.43				
U 6	CHANGE AUTOMOTIVE ALTERNATORS/GENERATORS ON GSE	91.01	1.43	1.30	28.73				
E 8	PERFORM OPERATIONAL CHECK ON GSE TO VERIFY DISCREPANCY	73.45	1.64	1.29	30.42				20
S 12	ADJUST FREQUENCY ON ELECTRICAL POWER UNITS	95.50	1.30	1.29	31.31				
U 4	CHANGE AUTOMOTIVE VOLTAGE REGULATORS ON GSE	89.88	1.38	1.24	32.55				
P 14	INCORPORATE SERVICE CHANGES ON GSE	79.77	1.54	1.22	33.78				
P 2	REPLACE CONSOLE HARDWARE (SCREWS, FASTENERS, BOLTS, ETC.)	84.27	1.35	1.21	34.98				
F 27	VISUALLY INSPECT GSE FOR APPARENT MALFUNCTIONS	78.65	1.39	1.10	37.22				25
T 3	TAKE CURRENT READINGS	79.77	1.36	1.08	38.50				
T 4	MEASURE FREQUENCY	78.65	1.36	1.07	39.36				
F 5	CHECK LOAD BANK FOR PROPER OPERATION	85.39	1.22	1.05	40.41				
U 17	INSTALL SENDING UNITS	85.39	1.15	1.02	41.43				30
S 11	ADJUST UPPER AND LOWER VOLTAGE LIMITS ON POWER UNITS	79.77	1.26	1.02	42.43				
S 1	REPLACE COMPONENT PARTS ON VOLTAGE REG OF POWER GEN SYS	76.40	1.28	0.98	43.43				
P 10	TIGHTEN LOOSE SCREWS, DZUS FASTENERS, ETC.	70.40	1.28	0.98	44.40				
U 11	FILL OUT SUPPORT ACTION FORMS (SASF)	79.77	1.20	0.95	45.36				
U 9	SPOT THE WIRING	77.53	1.21	0.94	46.30				35
U 14	REBUILD STARTERS BY REPLACING COMPONENT PARTS	74.16	1.25	0.92	47.22				
S 15	CHANGE ELECTRICAL POWER UNIT CABLES	84.27	1.10	0.92	48.14				
U 3	REBUILD ELECTRIC MOTORS (REPLACE ARMATURES, WINDINGS, ETC)	64.04	1.41	0.50	49.05				
U 11	ADJUST VOLTAGE REGULATORS	74.16	1.19	0.88	49.93				
Z 4	SERVICE BATTERIES	70.78	1.21	0.86	50.79				40
J 6	SCFT SOLDER GSE COMPONENTS	62.92	1.34	0.84	51.63				

0-TSK	TASK TITLE	1	2	3	4	5	6	7	8	9
Z	7 CHARGE BATTERIES	62.92	1.34	0.84	52.48					
T	12 TROUBLESHOOT EQUIP BY SUBSTITUTION OF KNOWN GOOD PARTS	75.28	1.12	0.84	53.32					
S	5 CLEAN SLIP RINGS	77.53	1.07	0.83	54.15					
U	15 REBUILD AUTOMOTIVE GENERATORS BY REPLACING COMP PARTS	65.66	1.13	0.82	54.57					45
U	16 REBUILD AUTOMOTIVE ALTERNATORS BY REPLACING COMP PARTS	69.66	1.16	0.80	55.77					
S	18 FABRICATE/REPAIR INTERCONNECTING ELECTRICAL CABLES	66.29	1.21	0.80	56.57					
Z	1 CLEAN BATTERY CASES	68.54	1.17	0.80	57.37					
J	14 CLEAN ELECTRIC/ELECTRONIC EQUIPMENT USING SOLVENT	60.67	1.31	0.80	58.17					
C	11 ORDER PARTS/SUPPLIES	64.04	1.22	0.78	58.95					50
T	11 USE BLOCK DIAGRAM	71.91	1.07	0.77	59.72					
Z	11 TAKE METER READINGS ON GSE	62.92	1.15	0.72	60.44					
R	1 ADJUST ENGINE OVER-SPEED SWITCHES	65.17	1.10	0.72	61.16					
S	6 STONE COMMUTATORS	70.78	1.01	0.72	61.87					
C	15 RESEARCH PUBLICATIONS TO OBTAIN SUPPLY DATA	59.35	1.15	0.69	62.56					55
U	19 CHANGE ELECTRIC MOTORS ON DRIVE AXLES	61.80	1.11	0.68	63.24					
S	19 REPLACE CANNON PLUGS	66.29	1.12	0.68	63.92					
T	1 IDENT COMPONENTS/CIRCUITRY OF ELECT. EQUIP LACKING SCHEM.	64.04	1.01	0.65	64.57					
S	7 REBUILD GENERATORS/ALTERNATORS ON POWER GEN SYS	64.04	0.96	0.61	65.18					
P	4 REPAIR CABLE/HOSE REELS	51.68	1.15	0.55	65.77					60
A	3 ENSURE WORK ASSIGNMENTS ARE COMPLETED	43.82	1.36	0.59	66.36					
Z	2 PREPARE NEW BATTERIES FOR SERVICE	48.31	1.18	0.57	66.93					
F	17 PERFORM DAILY INSPECTION ON GSE	44.94	1.25	0.56	67.50					
D	10 FILL OUT TECHNICAL DIRECTIVE COMPLIANCE (TDCC) FORMS	52.81	1.06	0.56	68.06					
S	5 REBUILD RELAYS	53.93	1.13	0.55	68.61					65
S	16 BUILD-UP ELECTRICAL POWER CABLES	47.19	1.13	0.53	69.14					
C	14 INVENTORY TOOLS/EQUIPMENT/SUPPLIES	49.44	0.95	0.47	69.61					
A	4 DIRECT (SUPERVISE) WORK IN PROGRESS	32.58	1.35	0.44	70.25					
C	20 PLACE IDENTIFYING MARKS ON TOOLS/EQUIPMENT	40.66	0.96	0.44	70.49					
Z	15 FUEL GSE	50.56	0.86	0.44	70.92					70
C	13 APPLY PRESERVATIVES TO ELECTRICAL/ELECTRONIC COMPONENTS	40.45	1.06	0.43	71.36					
J	15 PICK UP/TURN IN PARTS AND SUPPLIES	37.08	1.15	0.42	71.78					
F	6 PARTICIPATE IN "FOU" WALKDOWN	34.83	1.17	0.40	72.16					
J	16 WASH GSE	39.20	1.03	0.39	72.58					
X	19 ADJUST ENGINE GOVERNORS	37.08	1.00	0.37	72.95					75
Z	16 MAKE ROAD CALLS	34.83	0.96	0.37	73.32					
S	5 MEASURE CAPACITANCE	37.08	0.97	0.36	73.68					
T	2 DRAW SCHEMATIC DIAGRAMS	41.57	0.94	0.35	74.02					
V	4 REPLACE DRIVE BELTS ON GSE (FAN, POWER STEERING, ETC.)	40.06	0.76	0.35	74.37					
X	9 INSTALL GOVERNORS ON GSE	38.20	0.91	0.34	74.72					80
P	1 SAFETY WIRE EQUIPMENT	38.20	0.89	0.34	75.06					
T	13 RESEARCH PUBLICATIONS FOR TECHNICAL INFORMATION	25.84	1.30	0.34	75.39					85
C	4 FILL OUT SUPPLY REQUIREMENT FORMS	34.83	0.95	0.4	75.73					
C	18 SCREEN DEFECTIVE COMPONENTS TO DETERMINE REPAIR CAPABILITY	29.21	1.14	0.35	76.06					
U	7 CHANGE USE BLOWER PULVERS	32.58	1.35	0.44	76.49					
X	16 PERFORM ACCEPTANCE CHECKS ON GSE	33.70	0.96	0.32	76.72					
F	17 INSPECT GSE FOR CORROSION	33.70	0.96	0.32	77.04					
J	7 UNCRATE EQUIPMENT	43.82	0.73	0.32	77.36					
N	6 PAINT WORKING/LIVING SPACES	28.22	1.13	0.32	77.68					90
J	18 INSPECT REMOVED GSE COMPONENTS FOR CORROSION	30.34	1.04	0.31	78.01					
A	2 ASSIGN WORK LOADS	30.34	1.02	0.31	78.62					

FIGURE A-73, Page 3

O-TSK	TASK TITLE	Σ	Σ	Σ	Σ	N
X 15	CHANGE ROTOR ON GSE IGNITION SYSTEM	20.22	0.68	0.14	89.12	
J 8	REPAIR STRUCTURAL REPAIR ON GSE (WELD, STRAIGHTEN, ETC.)	19.10	0.10	0.13	85.25	145
D 20	FILL OUT MAN HOUR ACCOUNTING (MHA) CARDS	13.48	0.95	0.13	85.38	
C 17	ORDER OPEN PURCHASE ITEMS	14.60	0.89	0.13	89.51	
M 11	ADJUST FUEL RACK ON DIESEL ENGINES	16.85	0.76	0.13	85.64	
Z 8	REPACK WHEEL BEARINGS	17.98	0.72	0.13	85.77	
U 1	REPAIR EXPLOSIVE PROCE. ELECTRICAL SWITCHES	12.36	1.42	0.12	85.89	150
B 1	CONDUCT FORMAL CLASSROOM/OPERATIONAL TRAINING FOR LICENSING	14.60	0.66	0.12	90.01	
D 5	SCREEN WAITING PARTS (ANP) LIST	12.36	1.61	0.12	90.14	
X 14	CHANGE DISTRIBUTOR CAP ON GSE	18.10	0.86	0.12	90.26	
K 6	CHANGE TIRES ON GSE	20.22	0.82	0.12	90.39	
D 7	FILL OUT VISUAL INSPECTION DISPLAY SYSTEM (VIEWS) CARDS	14.60	0.84	0.12	90.51	155
F 24	PERFORM 30 DAY INSPECTION ON GSE	12.36	0.98	0.12	90.63	
X 17	CHANGE IGNITION POINTS IN GSE	19.10	0.64	0.12	90.75	
D 16	MAINTAIN LOGS/RECORDS/BATTERY ISSUE, SUPPLY, EQUIP, ETC.)	12.36	0.95	0.12	90.86	
D 22	REVIEW 3-M PRINTOUTS/HEADOUTS	13.48	0.88	0.12	90.98	
C 5	FOLLOW UP SUPPLY REQUESTIONS	13.48	0.87	0.12	91.09	160
A 7	MAKE PERSONNEL ASGMTS (WORK CENTERS, DV SECTIONS, ETC.)	10.73	1.15	0.12	91.21	
Z 21	CHANGE OIL IN GSE ENGINES	10.73	0.75	0.12	91.33	
F 4	POST SAFETY MATERIAL	10.73	0.85	0.11	91.44	
M 5	CHANGE FLY WHEELS ON GSE	10.73	0.84	0.11	91.55	
D 13	SCREEN MAINT. REC. CARD JRC1-DECK FOR ACCURACY/COMPLETENESS	10.73	1.03	0.11	91.65	165
X 16	CHANGE CONDENSOR ON GSE IGNITION SYSTEM	10.73	0.84	0.11	91.77	
F 23	PERFORM 60 DAY INSPECTION ON GSE	10.73	0.68	0.11	91.88	
P 13	CHANGE MECH. LINKAGE CABLES (HAND BRAKE, SAFETY LATCH, ETC.)	10.73	0.74	0.11	91.99	
L 7	CHANGE AIR CONDITIONER MECH. COMPONENTS (LINES, VALVES, ETC.)	10.85	0.66	0.11	92.10	
C 2	REPAIR/REPLACE/REPAIR SOURCE OF PARTS/SUPPLIES (NAVY, OPEN)	11.23	0.96	0.10	92.20	170
A 6	COURSE PERSONNEL CONCERNING MILITARY/PERSONAL MATTERS	15.73	0.67	0.10	92.31	
F 20	PERFORM 180 DAY INSPECTION ON GSE	12.36	0.81	0.10	92.41	
Z 4	POUR BATTERY TERMINALS	13.48	0.76	0.10	92.51	
V 3	REPLACE COMPONENT PARTS IN DIFFERENTIALS (GEARS, ETC.)	13.48	0.74	0.10	92.60	
Z 20	SERVICE COOLING SYSTEMS WITH ANTI-FREEZE	13.48	0.73	0.10	92.70	175
F 3	DISTRIBUTE SAFETY MATERIAL	10.11	0.57	0.10	92.79	
X 13	REMOVE/REPLACE DISTRIBUTORS ON GSE	14.60	0.67	0.10	92.89	
X 5	PERFORM ENGINE TUNE-UPS	15.73	0.63	0.10	92.99	
Q 1	QUALIFY/CALIBRATE GAUGES	11.23	0.60	0.09	93.07	
J 3	OXYACETYLENE WELD GSE COMPONENTS	12.36	0.74	0.09	93.16	180
Z 17	CLEAN FILTERS ON GSE	12.36	0.72	0.09	93.25	
M 7	CONDUCT PHYSICAL FITNESS PROGRAM	5.62	1.58	0.09	93.34	
A 5	COORDINATE WORKLOAD WITHIN DIVISION	8.99	0.96	0.08	93.42	
M 10	REVERSE FLYWHEEL STARTER RING	8.99	0.93	0.08	93.51	
J 4	ARC WELD GSE COMPONENTS	11.23	0.75	0.08	93.59	185
L 5	EVACUATE REFRIGERATION/AIR CONDITIONING SYSTEMS	12.36	0.71	0.08	93.67	
C 16	MAINTAIN PRE-EXPENDED BIN (PEB/FREE BIN)	8.99	0.96	0.08	93.76	
J 7	CUT METAL USING OXYACETYLENE EQUIPMENT	16.60	0.60	0.08	93.84	
P 5	MANUFACTURE CLOCKS	6.74	1.19	0.08	93.92	
X 10	CHANGE MAGNETS ON GSE	11.23	0.72	0.08	94.00	190
V 5	REPLACE WATER HOSES ON GSE (RADIATOR, HEATER, ETC.)	11.23	0.72	0.08	94.08	
P 12	SHARPEN DRILL BITS	12.36	0.66	0.08	94.16	
M 1	FLUSH GSE FUEL TANKS	13.48	0.60	0.08	94.24	
X 7	REBUILD GOVERNOR CONTROL UNITS	8.99	0.83	0.07	94.31	

FIGURE A-73, Page 5

D-TSK	TASK TITLE	X	Y	Z	N
M 25	REMOVE/REPLACE GSE ENGINES	11.23	0.67	0.67	195
V 1	CHANGE BRAKE SHOES	12.36	0.60	0.67	94.46
M 22	CHANGE FUEL PUMPS	8.99	0.79	0.67	94.53
E 6	CONNECT EXTERNAL POWER TO AIRCRAFT	6.74	1.06	0.67	94.59
E 11	ATTACH/REMOVE AIRCRAFT OR GSE TIE DOHNS	5.62	1.27	0.67	94.66
K 2	BREAK DOWN/BUILD UP TILES	12.36	0.58	0.67	94.73
X 3	IDENT MALFUNCTION COMP OF INTERNAL COMBUST ENGINES	11.23	0.63	0.66	94.79
M 3	SUBMIT BENEFICIAL SUGGESTIONS (BENNY SUGS)	11.23	0.58	0.66	94.86
D 2	MAINTAIN TECHNICAL LIBRARY	7.86	0.82	0.66	94.92
L 11	ADJUST EXPANSION VALVE/PRESSURE SWITCHES ON A/C SYSTEMS	13.43	0.53	0.66	94.99
D 3	SCREEN MESSAGE, BULLETINS, AND CHANGES FOR APPLICABILITY	7.86	0.79	0.66	95.05
R 14	BUILD UP GTC UNIT HOSES (HUFFER HOSES)	7.86	0.78	0.66	95.11
F 19	PERFORM 360 DAY INSPECTION ON GSE	7.86	0.77	0.66	95.17
J 25	PRIME/PAINT GSE COMPONENTS	6.74	0.89	0.66	95.23
V 1	REMOVE AND REPLACE AXLES ON GSE	10.11	0.61	0.66	95.29
L 5	BRACE GSE COMPONENTS	10.11	0.60	0.66	95.35
L 6	PURGE REFRIGERATION/AIR CONDITIONING SYSTEMS	10.11	0.60	0.66	95.41
L 13	LUBRICATE MECH COMPONENTS (GEARS, CAMS, LEVERS, ETC.)	11.23	0.54	0.66	95.47
C 1	SCREEN SUPPLY REQUESTS FOR CORRECTNESS	6.74	0.86	0.66	95.52
J 11	INSTALL NON-SKID CN GSE	5.62	1.24	0.66	95.58
E 22	PERFORM 91 DAY INSPECTION ON GSE	7.86	0.74	0.66	95.63
C 6	PREPARE INVENTORY REPORTS	7.86	0.73	0.66	95.69
M 6	ADMINISTER TESTS/EXAMINATIONS	5.62	1.02	0.66	95.75
M 19	SUBMIT INCIDENT REPORTS ON GSE	8.99	0.65	0.66	95.80
M 24	REPLACE FUEL LINES	8.99	0.63	0.66	95.86
E 11	INSTALL HOOD LATCHES	10.11	0.54	0.66	95.91
C 12	ISSUE TOOLS/EQUIPMENT/SUPPLIES	4.49	1.17	0.65	95.97
F 7	INSPECT TIME RIMS FOR DAMAGE	7.86	0.69	0.65	96.02
M 3	ISSUE GSE DRIVERS LICENSES	4.49	1.18	0.65	96.07
M 2	ADJUST TEMPERATURE CONTROL UNIT ON GTC	8.99	0.60	0.65	96.12
X 8	INSTALL WHEEL CYLINDER REPAIR KITS	8.99	0.55	0.65	96.17
M 17	MAINTAIN FILLS (CUSTODY CARDS, MESSAGES, ETC.)	4.49	1.13	0.65	96.22
V 8	CHANGE THERMOSTATS IN GSE COOLING SYSTEM	6.74	0.74	0.65	96.27
B 9	MAINTAIN TRAINING RECORDS	6.74	0.73	0.65	96.32
M 18	UPDATE PUBLICATIONS/INSTRUCTIONS	7.86	0.66	0.65	96.37
Y 21	CHANGE FILTERS ON HYDRAULIC SYSTEMS	5.62	0.92	0.65	96.41
F 25	PERFORM QA AUDITS	4.49	1.09	0.65	96.46
Y 7	INSTALL BRAKE MASTER CYLINDER KIT	8.99	0.55	0.65	96.51
B 11	WRITE TRAINING OUTLINES	8.99	0.55	0.65	96.56
B 8	WRITE LESSON GUIDES	10.11	0.49	0.65	96.61
B 13	REMOVE/REPLACE DUCT ASSEMBLY ON GTC UNIT	4.49	1.60	0.64	96.65
F 33	INSPECT HYDRAULIC SYS FOR SOURCE OF LEAKS (TACUBLES/HOOTS)	5.62	0.80	0.64	96.69
R 7	REMOVE/REPLACE MODULATING, SHUT-OFF VALVE ON GTC	6.74	0.71	0.64	96.74
J 23	REMOVE CORROSION CHEMICALLY	5.62	0.84	0.64	96.78
K 12	REMOVE/REPLACE AIR SCHED VALVE (PNEUMATIC SHUT-OFF VALVE)	5.62	0.60	0.64	96.83
D 2	VALIDATE GROUND SUPPORT EQUIPMENT (GSE) OPERATOR'S LICENSES	4.49	0.94	0.64	96.87
B 4	MAKE/HANDMADE TRAINING AIDS	4.49	0.97	0.64	96.91
Z 9	PRESSURE CHECK TIRES USING PRESSURE CHAMBER(SAFETY CAGE)	4.49	0.91	0.64	96.95
E 19	SERVICE AIRCRAFT HYDRAULIC SYSTEMS	2.24	1.67	0.64	96.99
X 4	ANALYZE MALFUNCTION OF INTERN COMBUST ENG & DETERMINE ACTION	7.86	0.61	0.64	97.03
P 2	REPLACE HUFFER/EXHAUST PIPES ON GSE	7.86	0.51	0.64	97.07

FIGURE A-73, Page 6

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D-TSK	TASK TITLE	X	Z	3	M
E	1 RIDE AIRCRAFT BRAKES			***	
J	20 PREPARE GSE SURFACE FOR PAINTING (FEATHER, CLEAN, ETC.)	3.37	1.13	97.10	
M	20 INSTALL EITHER SYS ON DIESEL ENG (CHEVROH SYSTEM)	5.62	0.67	97.14	
X	11 ADJUST CARBURETORS	6.74	0.66	97.17	
X	11 ADJUST CARBURETORS	6.74	0.55	97.21	
O	15 PREPARE OUTSTANDING DISCREPANCY REPORTS, EQUIP STATUS	6.74	0.54	97.25	250
Y	9 CHANGE WHEEL CYLINDERS	7.86	0.47	97.28	
L	9 CHANGE FILTER/DRIVERS IN AIR CONDITIONING UNITS	8.99	0.43	97.32	
X	20 ADJUST ENGINE TIMING	10.11	0.39	97.35	
B	7 GRADE TESTS/EXAMINATIONS	3.37	1.02	97.39	
9	PACKAGE DELICATE EQUIPMENT FOR SHIPMENT	4.49	0.73	97.42	255
D	17 ANALYZE MAINTENANCE DATA TO DETERMINE TRENDS	4.49	0.72	97.45	
M	15 REMOVE/REPLACE ENGINE HEADS ON GSE	4.49	0.75	97.48	
M	4 PRECFREAD PUBLICATIONS FOR ACCURACY/COMPLETENESS	5.62	0.61	97.51	
B	10 PREPARE TRAINING REPORTS	5.62	0.61	97.55	
M	6 REBUILD/REPAIR CARBURETOR	4.49	0.76	97.58	260
N	9 SCREEN/EVALUATE BENEFICIAL SUGGESTIONS	4.49	0.73	97.61	
V	6 REMOVE/REPLACE RADIATORS	7.86	0.42	97.64	
O	15 FOLLOW UP ON CR'S	4.49	0.68	97.67	
E	14 DIRECT AIRCRAFT USING STANDARD AIRCRAFT TAXI SIGNALS	4.49	0.71	97.70	
K	1 CHANGE LEAD SPRINGS	4.49	0.63	97.73	265
N	1 CONDUCT ZONE INSPECTIONS	3.37	0.92	97.75	
J	21 PRIME/PAINT GSE	4.49	0.70	97.78	
R	5 REPLACE DIAPHRAGMS IN FUEL CONTROL UNIT	3.37	0.85	97.81	
B	15 UPDATE TRG MATERIAL/LESSON GUIDES, PLANS, ETC.)	5.62	0.56	97.84	
Y	4 CLEAN REARSE	3.37	0.66	97.87	270
F	28 PERFORM MAGNETIC PARTICLE INSPECTIONS (MAGNA FLUX)	2.24	1.33	97.89	
X	6 ADJUST DIESEL INJECTOR TIMING	5.62	0.53	97.92	
B	2 SCHEDULE TRAINING	2.24	1.27	97.95	
Q	3 TEST/ADJUST SAFETY RELIEF VALVES	2.24	1.40	97.98	
M	5 REPAIR/REPLACE VALVES	1.12	2.24	98.00	275
R	3 REMOVE/REPLACE COMBUSTION CANS ON GTC	3.37	0.77	98.03	
F	18 PERFORM 500 START INSPECTION ON GAS TURBINE COMPRES (GTC)	2.24	1.22	98.05	
L	12 ADJUST THERMOSTAT/COOLING WATER REG ON AIR COND SYS	4.49	0.62	98.07	
B	12 PREPARE TESTS/EXAMINATIONS	4.49	0.61	98.10	
E	2 PUSH AIRCRAFT	2.24	1.12	98.12	280
Y	25 FLUSH HYDRAULIC SYSTEMS	3.37	0.76	98.15	
M	23 CHECK/TEST DIESEL FUEL INJECTORS FOR PROPER SETTING	4.49	0.59	98.17	
K	7 CHANGE SHOCKS ON GSE	4.49	0.59	98.19	
E	8 TOW AIRCRAFT	4.49	0.59	98.22	
V	13 REMOVE/REPLACE WATER PUMPS ON GSE	4.49	0.59	98.24	285
K	3 REPAIR TIRE INNER-TUBES	5.62	0.49	98.27	
J	19 STRIP PAINT FROM GSE SURFACE	3.37	0.71	98.29	
F	30 TEST & EVAL EXPERIMENTAL EQUIPMENT/PROCEDURES	3.37	0.61	98.31	
E	4 FUEL/OIL AIRCRAFT	2.24	1.05	98.33	
D	26 FILL OUT AVIATION MAINT SUPPORT EQUIP LABEL DATA CARDS	2.24	1.15	98.35	290
P	16 CHANGE CASTERS ON GSE	2.24	0.64	98.37	
D	23 WRITE REVISIONS TO EQUIPMENT OPERATING INSTRUCTIONS	3.37	0.67	98.39	
M	19 REMOVE/REPLACE ENGINE OIL PUMPS ON GSE	3.37	0.64	98.41	
V	16 CHANGE HYDRAULIC LINES ON GSE	4.49	0.47	98.43	
M	13 ROUTE CORRESPONDENCE (REPORTS, MESSAGES, ETC.)	3.37	0.66	98.45	295
J	27 WASH AIRCRAFT	2.24	0.56	98.47	

FIGURE A-73, Page 7

APPENDIX B

EPILOGUE

In the future, Evaluation of Training, both summative and formative, will be refined and conducted with tremendous efficiency. The advent of the computer has opened the door to practically unlimited possibilities in training applications. Much of what is theorized now is delayed only by the time factor required to accomplish. Continuing research and development of computer application indicates that within the next few years such events as installation of multipurpose, computer/communications-oriented systems will become a reality in the various operational elements. These multipurpose computer/communications systems will not only provide for increased tactical and operational fleet readiness and capability, but will also provide for rapid assessment, evaluation, and updating to maintain increases. Data collection, analysis, and presentation time will be reduced to practically nothing. Commonality in requirements and training will be identified and correlated. Manpower inefficiently utilized in the present structure will be made available for more critical and essential functions and superfluous manpower requirements will be eliminated, thus leading to greater overall efficiency and increased effectiveness. In the immediate area of training, such events as centralization of data, refinement to make all training job-relevant, and realization of the individual within the organization as the essential element, will soon arrive. Specifically, central computer data banks of Learning Objectives, Criterion Tests, training materials, etc. are being produced to be utilized by all elements of the services. Individual responsibility is increasing and will continue to do so to a much larger extent as the size of the military forces decreases and the individual task-load responsibility increases.

In this area, the man will have to be better trained, more relevantly trained, and more critically assessed than in the past. At the same time each individual's horizons will be expanded, cross-abilities developed, and the overall performance level increased. It will be a fair exchange, the man using the system and the system utilizing the man; each progressing in efficiency and effectiveness as it gives to the other.

APPENDIX C
ADDITIONAL READINGS

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